

oe W. Brown Park

Audubon Louisiana

Nature Cente

Lake Pontchartrain

**GREEN INFRASTRUCTURE NEEDS PLANNERS:** HOW PLANNERS SHOULD BE PUSHING THE RESILIENCY AGENDA

> KATIE COYNE, SITES AP, CERTIFIED ECOLOGIST - ESA

ASSOCIATE PLANNER/ ECOLOGIST

> MS COMMUNITY AND REGIONAL PLANNING UNIVERSITY OF TEXAS

MS SUSTAINABLE DESIGN UNIVERSITY OF TEXAS

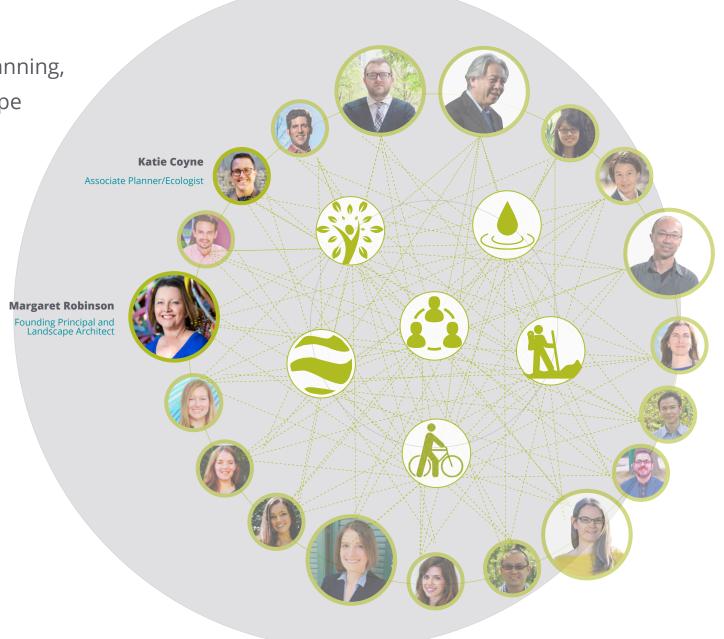
**BS ECOLOGY** UNIVERSITY OF FLORIDA

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### WHO WE ARE

Asakura Robinson is a planning, urban design, and landscape architecture firm which strengthens environments and positively impacts communities through innovation,

engagement, stewardship, and an integrated design and planning process.



### **THE URBAN ECOLOGY STUDIO**



MOBILITY + CONNECTIVITY

### **MAIN POINTS**

### 1. SYSTEMS THINKING 101

• What is it and why does it matter?

### 2. THINKING BEYOND THE SITE

• The importance of scale

### 3. STACKING LANDSCAPE FUNCTIONS

• Multifunctionality as a question of values

### 4. THAT'S COMPLICATED!

• A how-to example of thinking about multifunctional systems across scales

### 5. UNDERSTANDING VALUES

- Communicating internally
- Communicating with communities
- Communicating with policy-makers

### 6. ENGAGING EFFECTIVELY (TO UNDERSTAND VALUES)

• Engagement strategies and lessons from practice

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### **IN EDUCATION**

"Systems thinking utilizes habits, tools and concepts to develop an understanding of the interdependent structures of dynamic systems. When individuals have a better understanding of systems, they are better able to identify the leverage points that lead to desired outcomes." (The Waters Foundation)

### **IN MANAGEMENT AND LEADERSHIP**

"Systems thinking is a management discipline that concerns an understanding of a system by examining the linkages and interactions between the components that comprise the entirety of that defined system." (The Institute for Systemic Leadership)

### **IN RESILIENCE**

"The idea that nothing exists in isolation-but only as part of a system." And, "Systems thinking would enable us to perceive the patterns that connected otherwise disparate things and to detect the counter-intuitive logic underlying an often deceptive reality, thereby creating more coherent diagnoses, policies, and plans." (resilience.org)

### **IN URBAN PLANNING**

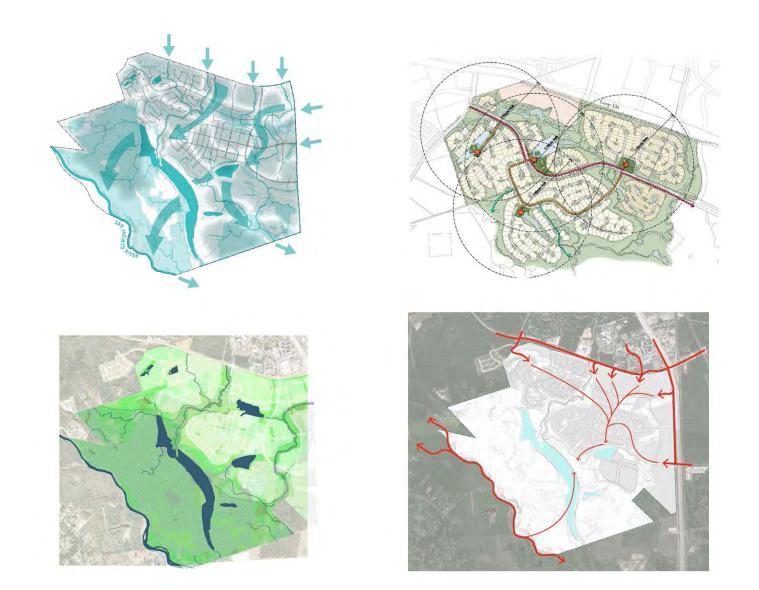
"Systems thinking can make cities work for people." And, "Understanding a city as a whole and finding pathways to more sustainable futures means integrating urban design, strategic thinking, economic analysis and engineering knowledge. It requires an appreciation of the complex interactions between different urban systems – everything from transport networks to social networks." (thoughts.arup.com)

### **IN ECOLOGY**

"Systems thinking is the process of understanding how things influence one another within a whole. In nature, systems thinking examples include ecosystems in which various elements such as air, water, movement, plants, and animals work together to survive or perish. In organizations, systems consist of people, structures, and processes that work together to make an organization healthy or unhealthy. Systems Thinking has been defined as an approach to problem solving, by viewing "problems" as parts of an overall system, rather than reacting to specific part, outcomes or events and potentially contributing to further development of unintended consequences." (environment-ecology.com)



### **URBAN ECOLOGICAL APPROACH**













From 2006 to 2011, large swaths of Syria suffered an extreme drought that, according to climatologists, was exacerbated by climate change. The drought lead to increased poverty and relocation to urban areas, according to a recent report by the Proceedings of the National Academy of Sciences and cited by Scientific American. "That drought, in addition to its mismanagement by the Assad regime, contributed to the displacement of two million in Syria," says Francesco Femia, of the Washington, D.C.-based Center for Climate and Security. "That internal displacement may have contributed to the social unrest that precipitated the civil war. Which generated the refugee flows into Europe." And what happened in Syria, he says, is likely to play out elsewhere going forward.









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### **SCALER THINKING**



BAGBY STREET, HOUSTON, TX: 0.62 MILES



# **AMD SITE:** 59 ACRES



WALLER CREEK WATER-SHED: 3,218 ACRES

### WALLER 3, AUSTIN, TX: 700 ACRES

MUELLER DEVELOPMENT, AUS-TIN, TX: 700 ACRES

SOUTH CENTRAL WATERFRONT, AUS-TIN, TX:

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118 ACRES

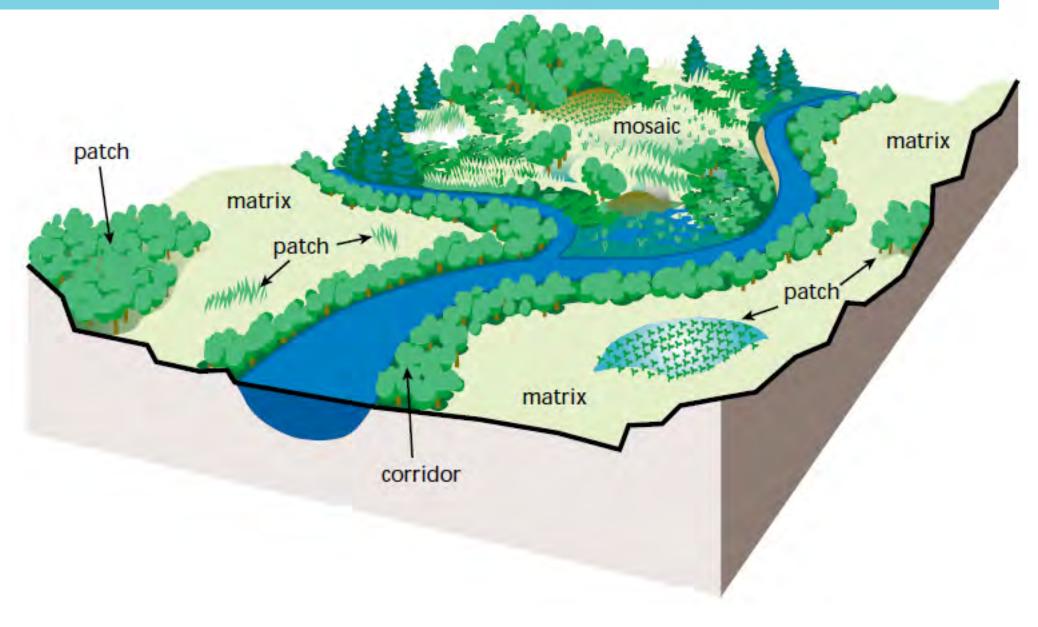
AMD SITE, AUSTIN, TX:

59 ACRES

**BAGBY STREET, HOUSTON, TX:** 

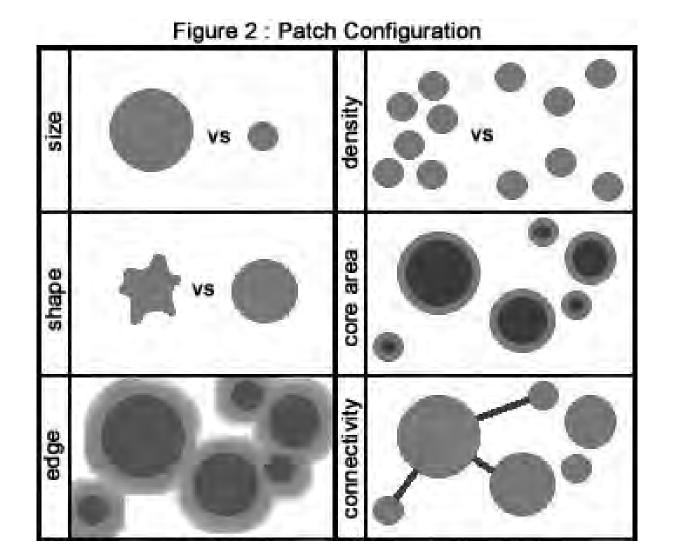
0.62 MILES

### LANDSCAPE ECOLOGY AND ECOSYSTEM FUNCTION



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### LANDSCAPE ECOLOGY AND ECOSYSTEM FUNCTION



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### **VISUALIZING NETWORKS**





### VISUALIZING SCALE



#### Landscape Resilience Framework

This framework helps guide practical applications of resilience in landscape-scale urban design and natural resource management. Here each tenet is brought to life in a high-level example in Silicon Valley to show how coordinated actions can create a more resilient landscape for native ecosystems.

#### Setting

Determines the constraints and opportunities within a landscape. Iocal species — like oaks, Cooper's havks, and redwoods — thrive in the unique conditions and

#### Processes Connectivity Create and sustain landscapes in a dynamic way. Creeks carry Bibacian corridors provi

Enables movement of materials and organisms. Riparian corridors provide wildlife passageways from the hills to the Bay.

#### 05 Redundancy Provides insurance

Provide a range of options for wildlife. Willow groves ensure Diverse plant communtites and floodplains of habitats under different inate conditions.

Complexity

Scale Determines which processes and functions can operate meaningfully. Anticipate and accommodate sea level rise by providing space for bayland habitats to migrate inland

over time.

People Shape landscapes and provide opportunities. Plant native oaks in the urban and suburban landscape to mimic the form and function of former oak woodlands.

### Google Ecology Program

We collaborate to design vibrant living systems in the communities Google calls home.

#### Program Scale Individual

Emphasis

Partners

Key Audiences/

#### Experience

- + Google employees
- + Community members
- + Local environmental groups

#### Campus

#### Dosg

- Google campus design
   & development teams
- + Local environmental groups
- + Mountain View city & community
- Other city planners, designers, architects

Regional

#### Science

- + Google campus design & development teams
- + Regional Science Advisory Group
- + Local environmental groups
- + Regulatory agencies
- + Land owners, city officials

#### Global

#### Philosophy & Framework

- + Google campus design-& development teams
- + National Science Advisory Group
- + Land use planners & ecological restoration experts



### **CITY-SCALE ACTION**



The Metropolitan Government of Nashville and Davidson County **Green Infrastructure Master Plan** 





November 1, 2009

## NYC GREEN INFRASTRUCTURE PLAN

A SUSTAINABLE STRATEGY FOR CLEAN WATERWAYS

Michael R. Bloomberg. Mayo Cas Holloway, Commissioner













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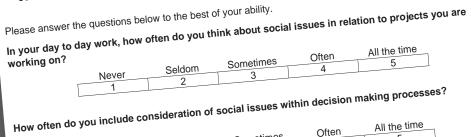


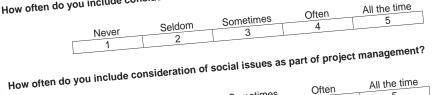
CULTURAL AND SOCIAL ISSUES IN ENVIRONMENTAL PLANNING Participation in this survey is entirely voluntary. The results will contribute to my thesis research as a graduate student in the Community and Regional Planning/Sustainable Design programs at the University of Texas. The purpose of this research is to better understand the relationship practitioners of ecological restoration projects have between their practice and social and cultural issues. The survey below should take less than 5 minutes and is being distributed to all Urban Riparian Symposium participants. Survey responses will remain and to being distributed to an orban repairan symposium participants, our voy responses will remain an anonymous however email addresses will be requested to contact two randomly selected participants to distribute a \$25 amazon gift card. Thank you for your participation. If you have any questions please contact

#### me:

#### Katie Coyne kacoyne@utexas.edu 561.339.5712

Please answer the questions below to the best of your ability.





Often Sometimes 5 Seldom Never 3 2

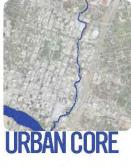
Do you consider human culture to be part of ecological restoration projects?

Extremely Very Somewhat 5 Very little Not at all Identify one social component that is related (directly or indirectly) to an ecological aspect of a project

you are working on.

ŝ See reverse

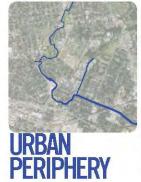






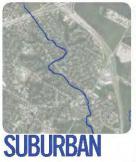










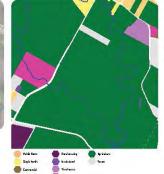










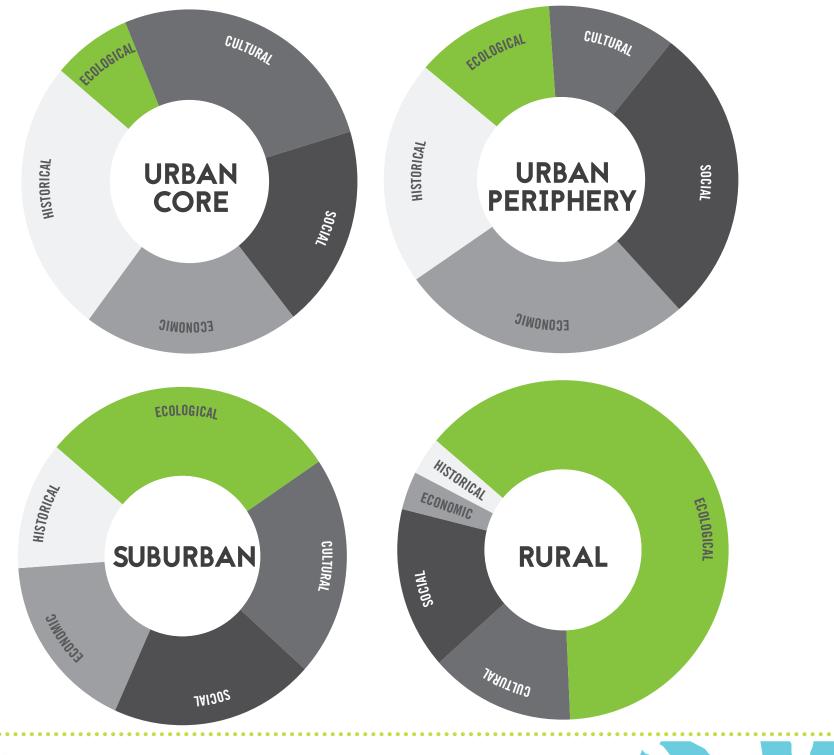






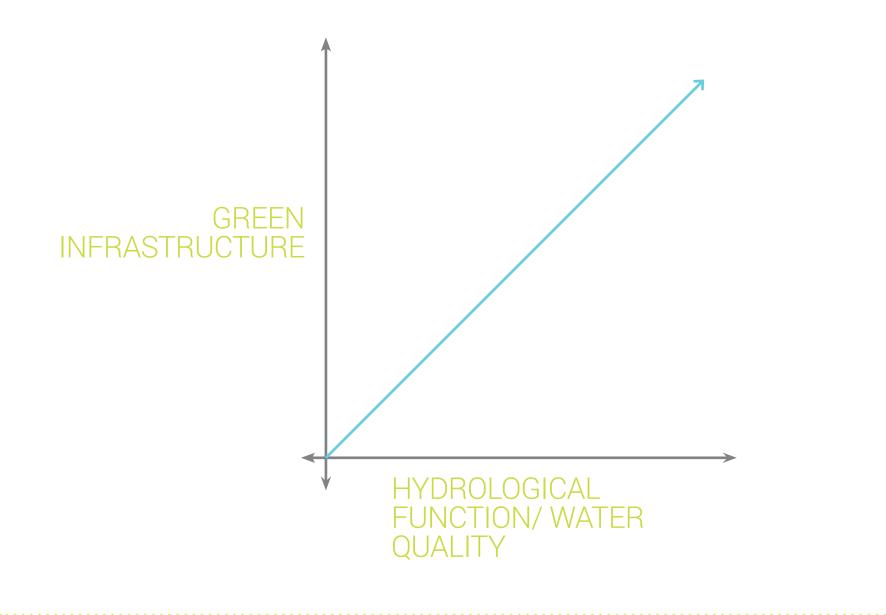


# **AUSTIN'S** CREEK TRANSECT



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### HYDROLOGICAL BENEFITS



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# **ECOSYSTEM BENEFITS** MAXIMUM INTERCONNECTION OF **GREEN NETWORKS GRFFN INFRASTRUCTURE** GREEN INFRASTRUCTURE PROJECTS WITH-- OUT LOCAL OR REGIONAL CONNECTIONS ECOSYSTEM SERVICES















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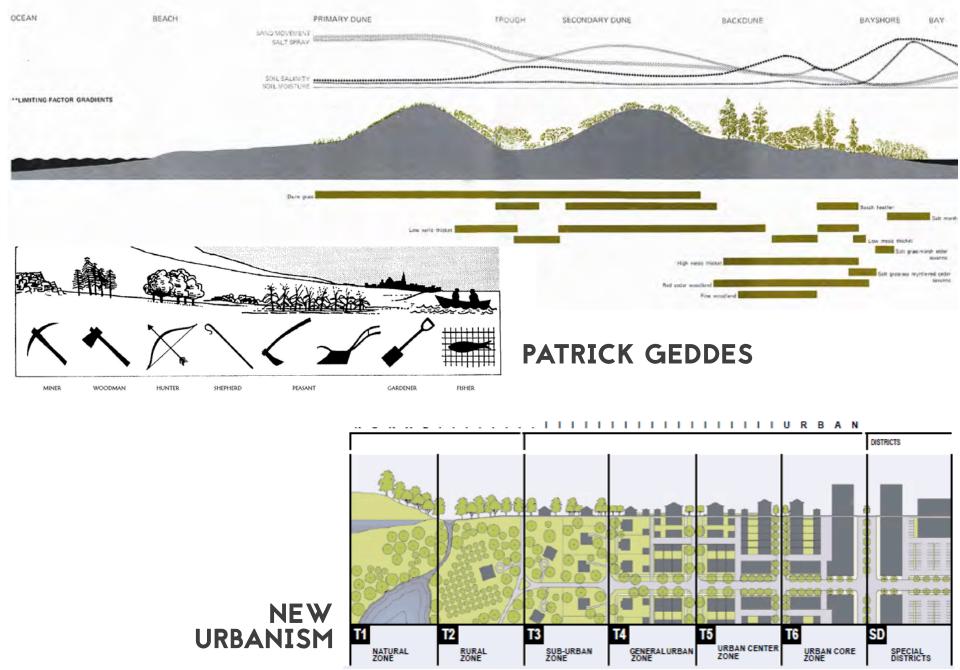
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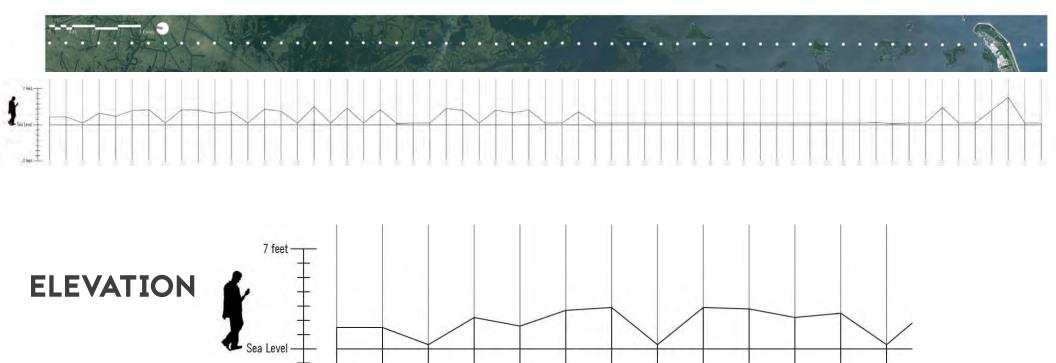
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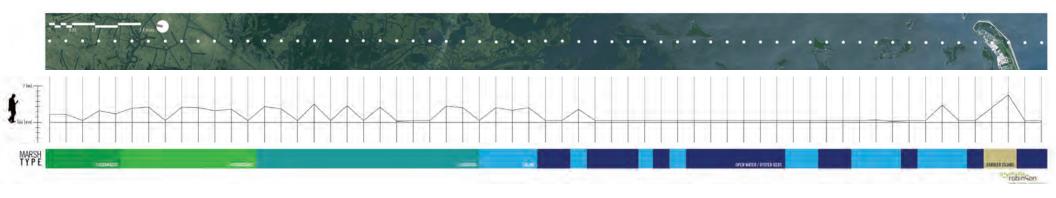


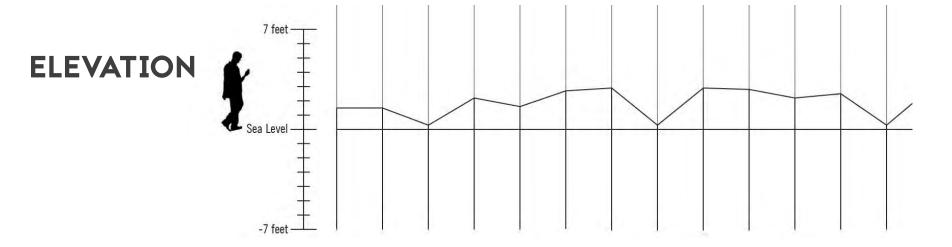


-7 feet

asakura robinSon

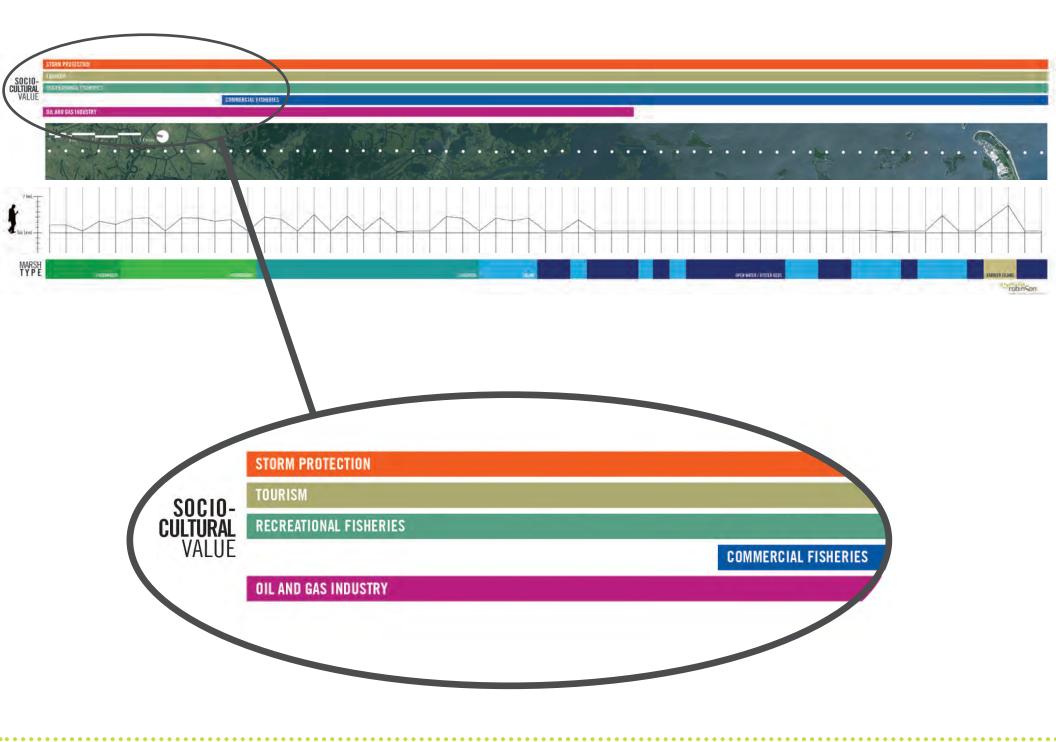




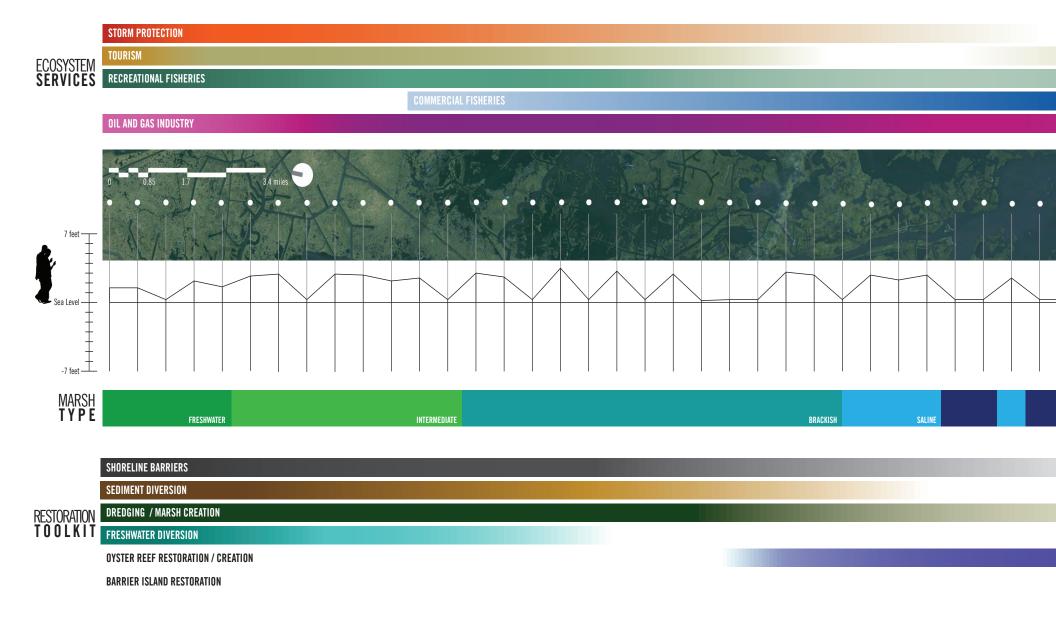


MARSH TYPES









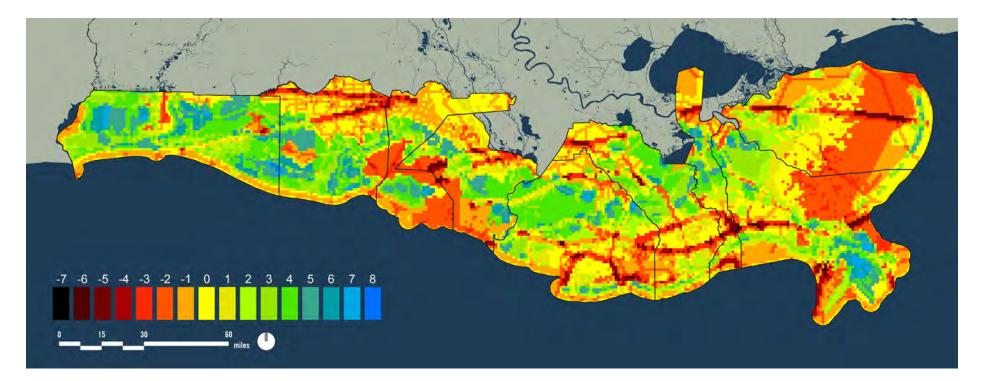
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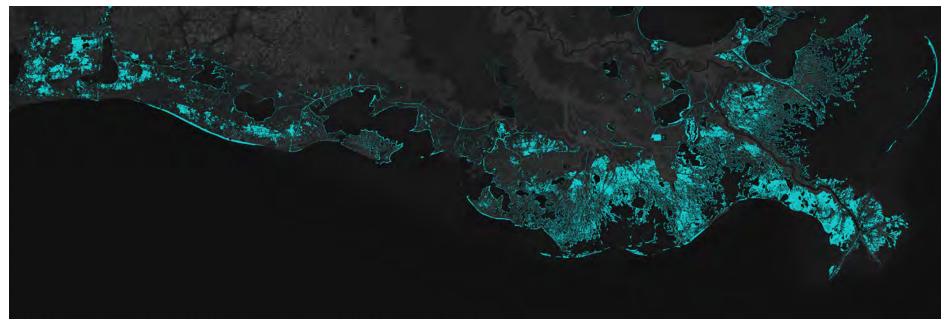
COASTAL ECOSYSTEM TRANSECT	MARSH	INTERMEDIATE MARSH	BRACKISH Marsh	BAYS AND SALT MARSH	BARRIER ISLANDS
New Drieans Transect					
Marsh Open Water Submerged Marsh Human Settlement Barrier Island	J.				
CHARACTERISTIC VEGETATION, ETC.	hemitomon (maidencane) Other: Eleocharis spp., Sagittaria Iancifolia, Alternanthera philoxeroides, Spartina patens, Phragmites communis, Bacopa monnieri, Ceratophyllum demursum, Cyperus odoratus, Eichhornia crassipes, Pontederia cordata, Peltandra virginica, Hydrocotyle spp., Lemna minor, Myriophyllum spp., Nymphaea odorata, Typha spp., Utricularia spp., Vigna	<b>Dominant:</b> Spartina patens (wiregrass) <b>Other:</b> Phragmites communis, Sagittaria lancifolia, Bacopa monnieri, Eleocharis spp., Scirpus olneyi, S. californicus, S. americnaus, Vigna luteola, Paspalum vaginatum, Panicum virgatum, Leptochloa fascicularis, Pluchea camphorata, Echinonchloa walteri, Cyperus odoratus, Alternanthora philoxeroides, Najas guadalupensis, Spartina cynosuroides, and S. spartineae	<b>Dominant:</b> Spartina patens (wiregrass) <b>Other:</b> Distichlis spicata, Schoenoplectus olneyi, S. robustus, Eleocharis parvula, Ruppia maritima, Paspalum vaginatum, Juncus roemanianus, Bacopa monnieri, Spartina alteriflora, and S. cynosuroides	<b>Dominant:</b> Spartina alterniflora (smooth cordgrass) in marsh areas; Crassostrea virginicus (American oyster) creates reefs Other: S. patens, Distichlis spicata, Juncus roemarianus, and Batis maritima	Salt tolerant xeric grasses and succulent herbs on the dunes grading into salt marsh vegetation on the inland side <i>Batis maritima</i> (saltwort), <i>Salicornia virginica</i> (glasswort), stunted forms of <i>Distichlis</i> <i>spicatata</i> (salt grass), and <i>Spartina alterniflora</i> (smooth cordgrass)
VALUE	<ul> <li>Most biodiverse of any marsh type</li> <li>Provides habitat for birds, butterflies, and reptiles of conservation concern</li> <li>Provides filtration of pollutants before entering other marsh ecosystems</li> <li>Final buffer between dense human settlement and storm surge</li> <li>Carbon sink</li> </ul>	<ul> <li>Very important to many bird species of conservation concern</li> <li>Supports large numbers of wintering water fowl</li> <li>Critical nursery habitat to larval marine organisms</li> <li>Provides further filtration of pollutants</li> <li>Buffers storm surge</li> <li>Carbon sink</li> </ul>			Initial and vital line of defense against storms
	Carbon sink			asakura robir	

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COASTAL ECOSYSTEM TRANSECT	FRESHWATER MARSH	INTERMEDIATE MARSH	BRACKISH MARSH	BAYS AND SALT MARSH	BARRIER ISLANDS			
Marsh Open Water Submerged Marsh Human Settlement Barrier Island								
SALINITY	< 2 ppt • Marsh restoration	3-10 ppt • Marsh restoration	8 ppt mean • Marsh restoration	16 ppt mean  Marsh restoration	<ul><li>16-35 (gulf-side) ppt</li><li>Marsh restoration</li></ul>			
RESTORATION OPTIONS	Canal infill     Freshwater diversion	<ul> <li>Marsh restoration</li> <li>Ridge restoration</li> <li>Canal infill</li> <li>Freshwater diversion</li> </ul>	<ul> <li>Marsh restoration</li> <li>Ridge restoration</li> <li>Canal infill</li> <li>Freshwater and sediment diversion</li> </ul>	<ul> <li>Marsh restoration</li> <li>Ridge restoration</li> <li>Canal infill</li> <li>Freshwater and sediment diversion</li> <li>Oyster reef creation</li> </ul>	<ul> <li>Marsh restoration</li> <li>Sediment diversion</li> <li>Oyster reef creation</li> <li>Jetty reinforcement</li> <li>Dune planting</li> </ul>			
RESTORATIONS PROS	<ul> <li>Stores 81 to 216 metric tons of carbon per acre</li> <li>Most affected marsh system with highest rates of loss</li> <li>Highest biodiversity of any coastal marsh type</li> </ul>	<ul> <li>Stores 81 to 216 metric tons of carbon per acre</li> <li>Important habitat to many conservation species</li> <li>Critical estuary habitat to healthy local fisheries</li> <li>Important buffer in preserving existing freshwater marsh</li> </ul>	<ul> <li>Stores 81 to 216 metric tons of carbon per acre</li> <li>Important habitat to many conservation species</li> <li>Critical estuary habitat to healthy local fisheries</li> <li>Important buffer in preserving existing freshwater and intermediate marsh</li> </ul>	<ul> <li>Stores 81 to 216 metric tons of carbon per acre</li> <li>Acts as a sink to filter out nitrogen and phosphorus - improving water quality across local systems</li> <li>Important habitat to many conservation species</li> <li>Critical estuary habitat to healthy local fisheries</li> <li>Important buffer in preserving all other marsh types</li> <li>Stores large volumes of water during and after storm events</li> </ul>	Acts as a vital storm buffer necessary to all other marsh health			
RESTORATIONS CONS	<ul> <li>Needs influx of freshwater (not viable along levees)</li> <li>Potentially unsustainable as sea levels rise - little to no tolerance for increased salinity</li> </ul>	<ul> <li>Needs some influx of freshwater (less viable along levees)</li> <li>Potentially unsustainable as sea levels rise - low tolerance for increased salinity</li> </ul>	<ul> <li>Needs some influx of freshwater</li> <li>Potentially unsustainable as sea levels rise - intermediate tolerance for increased salinity</li> </ul>	<ul> <li>Most fragmented habitat</li> <li>Least biodiverse habitat</li> <li>Some historic marsh areas have transitioned to oyster reef or open water</li> </ul>	<ul> <li>Cost</li> <li>Requires ongoing maintenance</li> <li>Short life expectancy of projects</li> </ul>			
AVERAGE COST/ACRE RESTORED	MARSH \$131,4 Diversion \$11,95		reduce	wide, coastal wetlands hurricane damage in the over \$3,800/acre/year. (The Conservation Fund)	BARRIER ISLAND \$123,302.00			
ASAKUſA robinSon K. COYNE GREEN INFRASTRUCTURE NEEDS PLANNERS								

2







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**DUTCH VALUES AND THE PRECAUTIONARY PRINCIPLE:** Today, a national system of dikes and surge barriers provide a level of protection unheard of in the U.S. - protection against an event with a probability of occurring once every 10,000 years. That's not a typo. (EDF.org)







### VALUE/GOAL SYSTEMS





VALUES AND GOALS IN CON-FLICT

3

GOALS ALIGN



### VALUE/GOAL SYSTEMS

# **VALUES AND GOALS ALIGN**



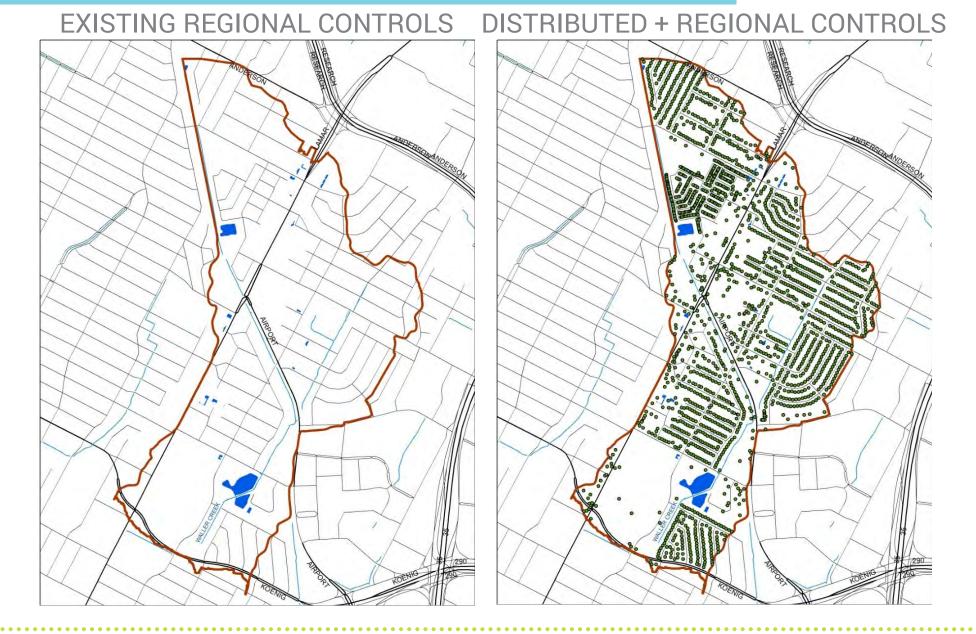
**GOALS** 

**ALIGN** 

VALUES AND GOALS IN CON-FLICT

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## **DISTRIBUTED SMALL-SCALE CONTROLS**





URBAN STREAM SYNDROME

# WATER QUANTITY

INNAKA AN ZU







K. COYNE GREEN INFRASTRUCCIURE INE EDISTRUCTURE CALE GREEN INFRASTRUCTURE





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# **OUR ENGAGEMENT PROCESS**

#### 1. Just listening

2. Compiling what we heard

- **3. Providing concepts for initial feedback**
- 4. Listening more...
- 5. Final compilation of concepts + final community comment period
- 6. Accessible implementation strategy











K. COYNE GREEN INFRASTRUCTURE NEEDS PLANNERS

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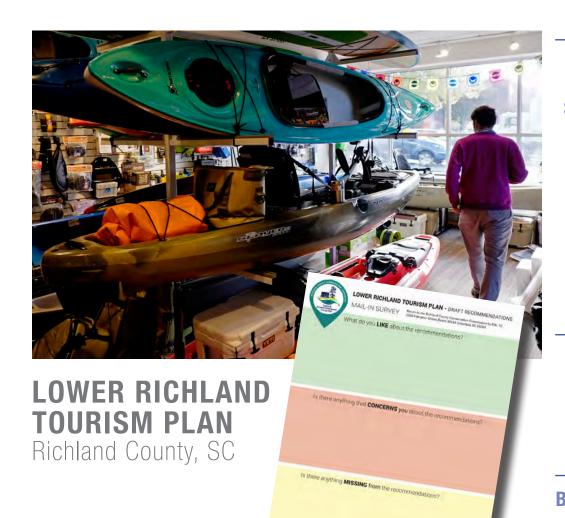
#### LANDA PARK AND ARBORETUM MASTER PLAN

New Braunfels, TX

**3. Providing concepts for initial feedback** 



# **PROCESS**



#### 4. Listening more...

#### **STAKEHOLDER INTERVIEWS**

- LOCAL. Congaree National Park
- COUNTY, USDA Rural Development
  - HUD Community Development Block Grant

STATE, AND . SC Department of Natural Resources

**FEDERAL** •

- SC State Representative Joe Neal
- Clemson University Extension
- University of South Carolina Hospitality Department
- Richland County Economic Development Department
- Richland County Conservation Commission
- Richland County Planning Department
- Richland County Library System
- Council Member Dalhi Meyers
- Council Member Norman Jackson
- Mayor Geraldene Robinson City of Eastover
- N • Palmetto Conservation Foundation

#### NON-PROFIT

- Congaree Land Trust
- South Carolina Uplift
- Historic Columbia
- Southeast Rural Community Outreach
- Friends of Congaree/Cowassee

#### BUSINESSES • River Runner Outfitter

- The Cycle Center
- Wavering Place Bed and Breakfast
- Carolina Bay Farms
- Cabin Branch Organic Farms

. . . . . . . . . . . . . . . .

• Manchester Quail Farm



 OTHER
 Over 20 local church pastors

 K. COYNE
 GREEN INFRASTRUCTURE NEEDS PLANNERS andowners



#### **OPEN HAUS EXHIBITS**



**MASTER PLAN** 

New Braunfels, TX

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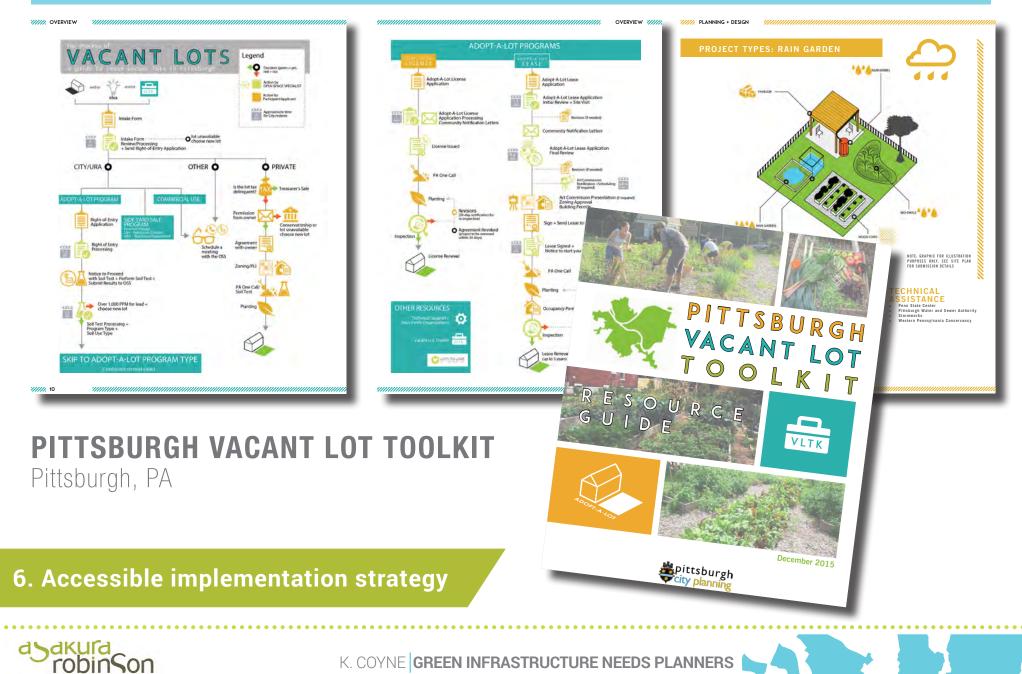
NDA PARK RBORETUM

> WILLOW WATERHOLE PRAIRIE MANAGEMENT AREA PUBLIC ACCESS PLAN

5. Final compilation of concepts + final community comment period

Houston, TX





# **SCENARIO: Mitigating Conflict**



#### LOWER RICHLAND TOURISM PLAN

Richland County, TX

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#### WILLOW WATERHOLE PUBLIC ACCESS PLAN

Houston, TX

# **SCENARIO: Connecting Communities**



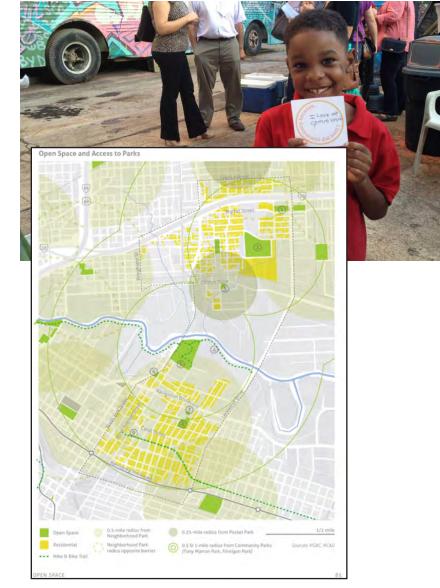
K. COYNE GREEN INFRASTRUCTURE NEEDS PLANNERS

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# **SCENARIO:** Working with Underserved Communities



#### **FIFTH WARD/BUFFALO BAYOU/ EAST END LIVABLE CENTERS STUDY** Houston, TX





# **SCENARIO: Balancing Goals**

#### SURVEY - MAJOR TAKEAWAYS



# THE PARK IS BEING LOVED TO DEATH!



#### LANDA PARK AND ARBORETUM MASTER PLAN

New Braunfels, TX



**GENE GREEN PARK** Houston, TX



# **KEY TAKEAWAY: Tailored Outreach**

PUBLIC INPUT CONTACT

NEWS

#### LANDA PARK & ARBORETUM

MASTER PLAN

HOME ABOUT TIMELINE



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# **KEY TAKEAWAY: Community Leadership**

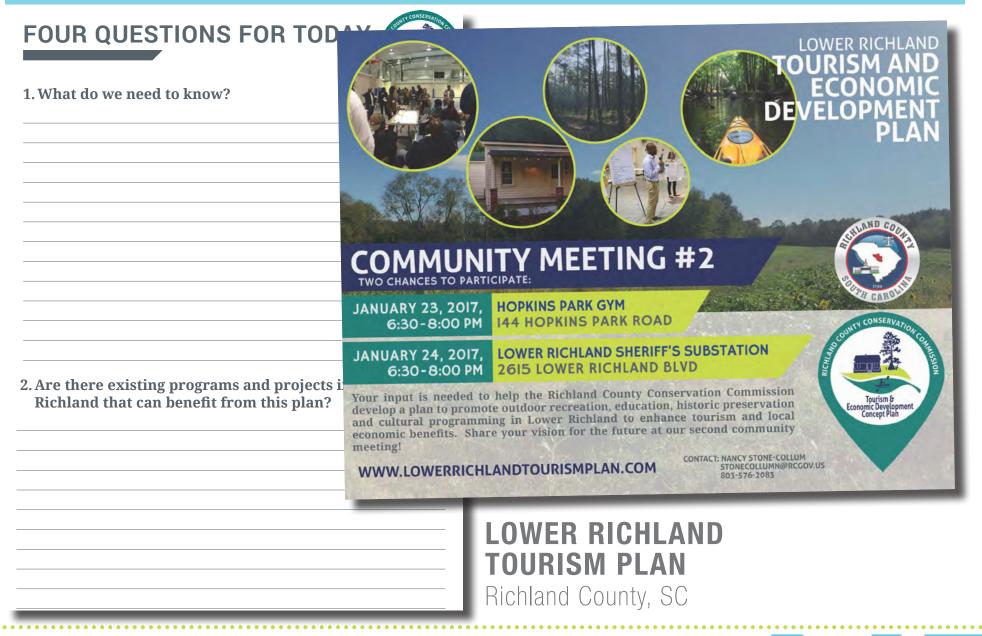




**LOWER RICHLAND TOURISM PLAN** Richland County, SC



# **KEY TAKEAWAY: Staying Flexible**





# **KEY TAKEAWAY: Managing Expectations**



#### LANDA PARK & ARBORETUM MASTER PLAN

New Braunfels, Texas



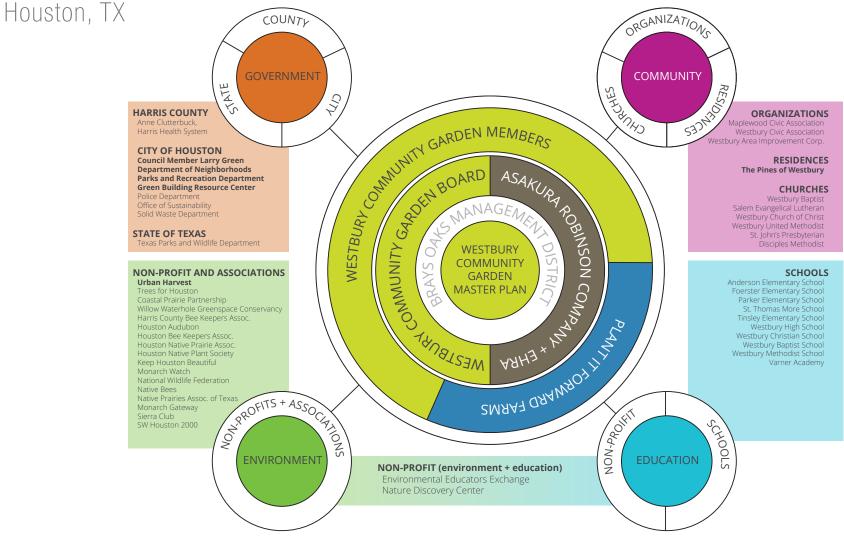






# **KEY TAKEAWAY: Pathways to Implementation**

#### **WESTBURY COMMUNITY GARDEN MASTER PLAN**



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# **TECHNIQUES: Site Walk/Site Dissection**



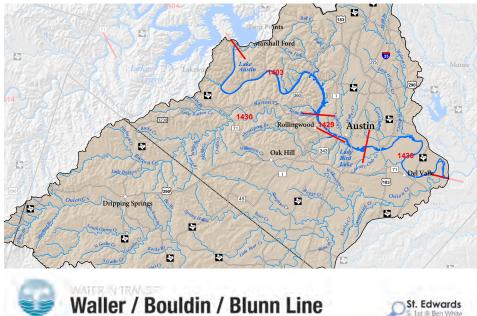
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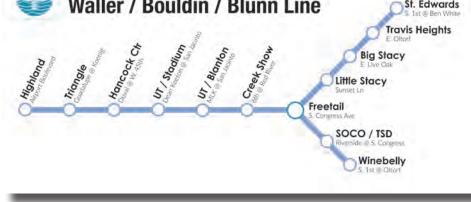
# **TECHNIQUES: Translating Data**

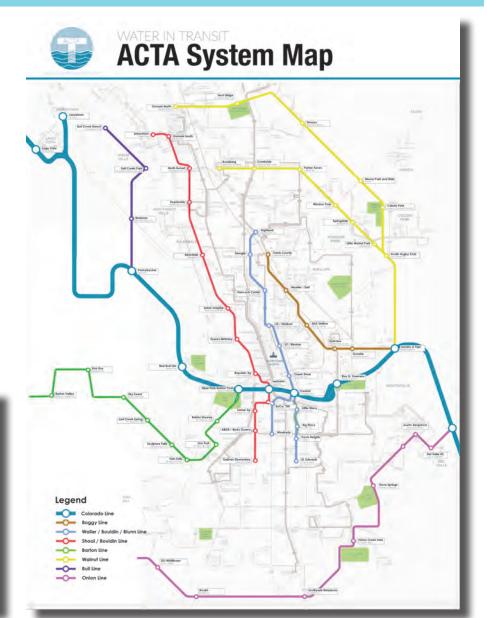
#### WATER IN TRANSIT CREEKSHOW SUBMISSION

Austin, Texas

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# **TECHNIQUES:** Breaking Down the Tough Questions

**BREAKOUT SESSION #1** 

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WHY DO YOU CHOOSE TO LIVE IN SUNSET VALLEY? WHAT ARE PLACES THAT ARE SPECIAL TO SUNSET VALLEY? WHAT'S MISSING IN SUNSET VALLEY?

**BREAKOUT SESSION #2** 

WHAT HAVE YOU SEEN AT THE UPLANDS SITE?

**BREAKOUT SESSION #3** 

WHAT WOULD LIKE TO SEE AT THE UPLANDS SITE? WHAT WOULD LIKE TO DO THERE?



K. COYNE **GREEN INFRASTRUCTURE NEEDS PLANNERS** 

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# QUESTIONS?