

# ADAPTATION CO-CREATION SERIES

The space where innovation and climate resilience meet

[www.adaptationprofessionals.org  
/adaptation-co-creation-series](http://www.adaptationprofessionals.org/adaptation-co-creation-series)



# ADAPTATION CO-CREATION SERIES

## Webinar 6: Visualizing Change

*How interactive platforms bring climate planning to life*



# Hazen



# Tech Check!



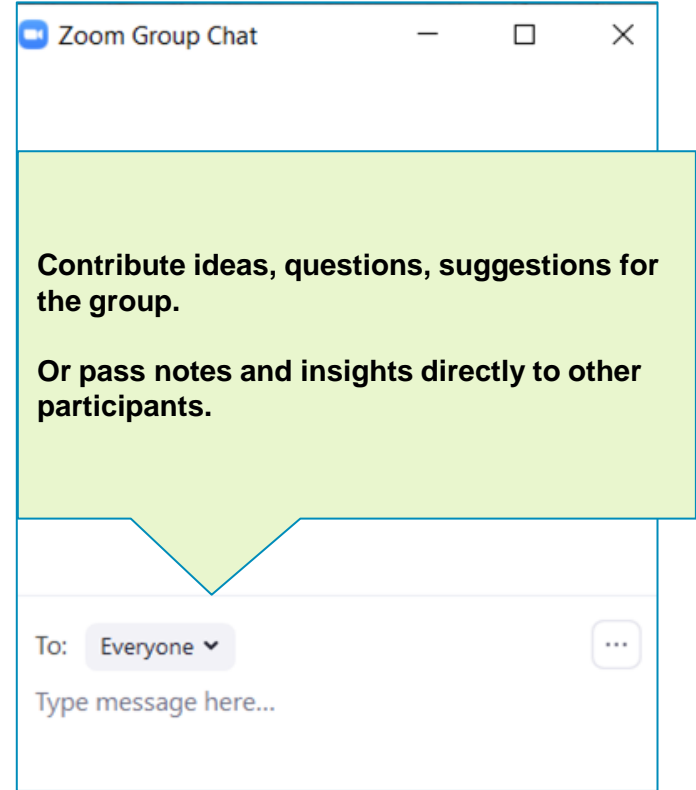
► Microphones Off



► Cameras off or on



► Questions posted in chat or via Q&A Box



# ASAP Mission

Connect and support climate change adaptation professionals to advance innovation and excellence in the field of climate change adaptation.





# American Society of Adaptation Professionals

## ▶ ASAP Connects

Bringing members together on critical topics including: Professional education, Climate Migration, Public Policy, and Justice Equity, Diversity & Inclusion

## ▶ Adaptation Voices

Share member accomplishments, best practices in the adaptation and resilience field, and lift diverse stories of leadership and expertise.

## ▶ Adaptation Careers

Assisting members to excel in their current jobs through mentorship and access to peer learning; explore new opportunities through weekly jobs and boards

[www.adaptationprofessionals.org](http://www.adaptationprofessionals.org)

# Upcoming Activities

**ASAP Network Meeting**  
**Connect. Celebrate. Recharge.**  
**September 13 -15, 2021**



## ASAP Private Sector Climate Service Providers Academy

AMERICAN SOCIETY OF  
ADAPTATION PROFESSIONALS



GLISA  
A NOAA RISA TEAM



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Second Nature



THE UNIVERSITY OF ARIZONA  
ARIZONA INSTITUTES FOR RESILIENCE  
Center for Climate  
Adaptation Science  
& Solutions



*Join us in driving forward  
transformative adaptation & resilience*



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# ADAPTATION CO-CREATION SERIES

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## What to Expect

- ▶ Innovative & Effective Adaptation Practices
- ▶ Diverse project teams
- ▶ Justice and equity woven throughout

## Past Webinars

- ▶ Reducing flooding through updated design codes & standards
- ▶ Innovations in Adaptation Finance
- ▶ Practicing Racial & Environmental Justice in Climate Adaptation
- ▶ Corporate Adaptation & the TCFD Journey
- ▶ Bridging the Partisan Divide with Climate Resilience Solutions

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## Webinar 6: Visualizing Change

*How interactive platforms bring climate planning to life*

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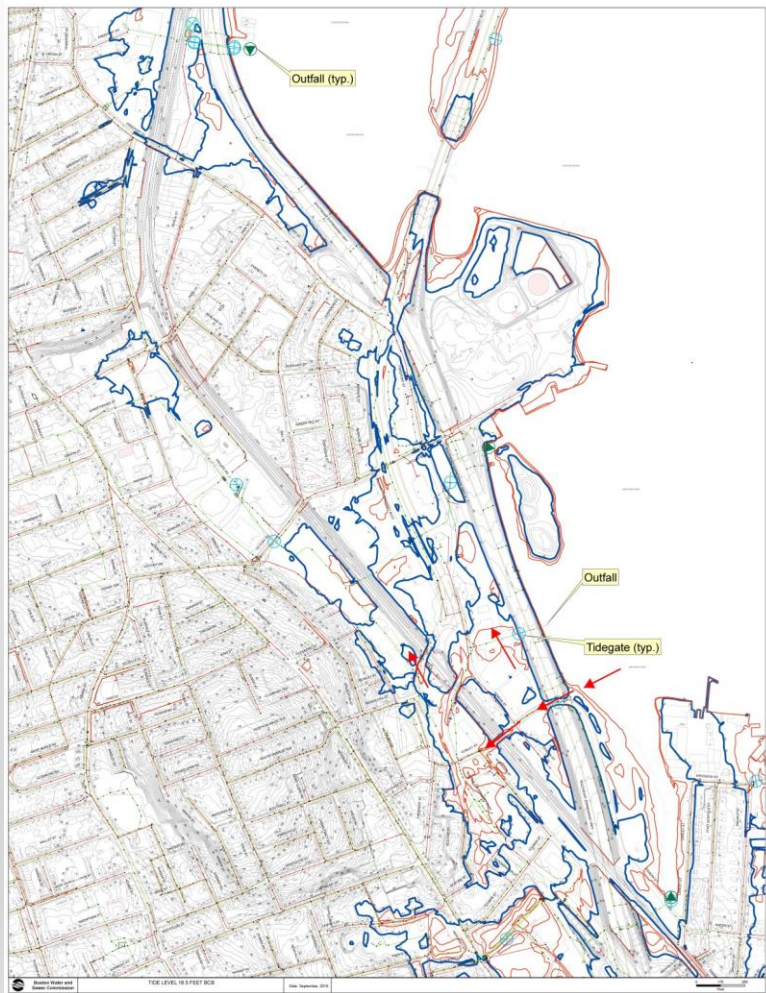
## June 2021 - Co-Creation Webinar - Session 6: Visualizing Change

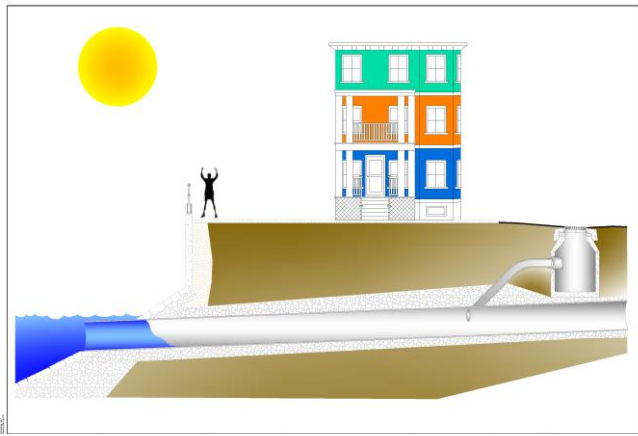


# BWSC Collection System

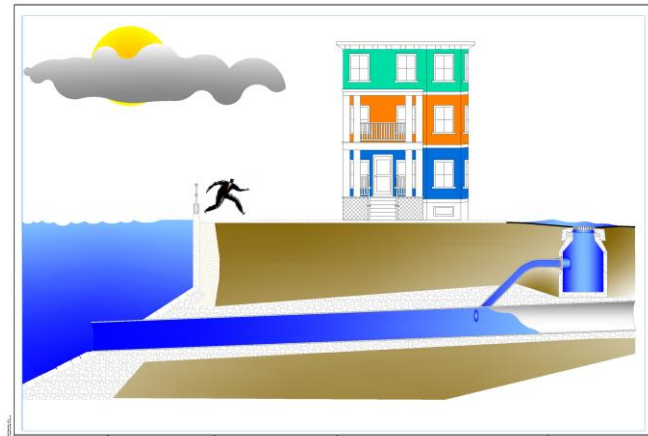
- 1,536 miles of sewer and drain pipes
  - (156 miles combined, 710 miles sanitary, 670 miles storm drain)
- Sewers range from 8 inch to 108 inch
- Drains range from 12 inch to 240 x 186 inch
- 9 pump stations
- 586 outfalls total
- 201 tidegates
- 50,605 manholes

# Outfall Screening

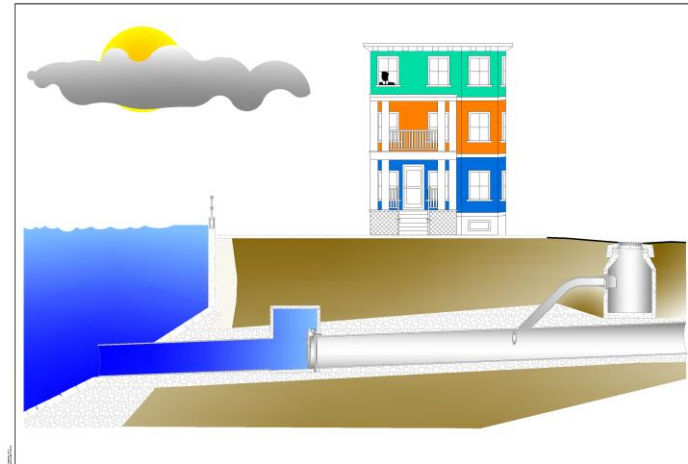




Storm Drain Outfall at Low Tide



Storm Drain Outfall at High Tide without Tide Gate



Storm Drain Outfall at High Tide with Tide Gate



## NEW TIDE GATES MT. WASHINGTON AVE



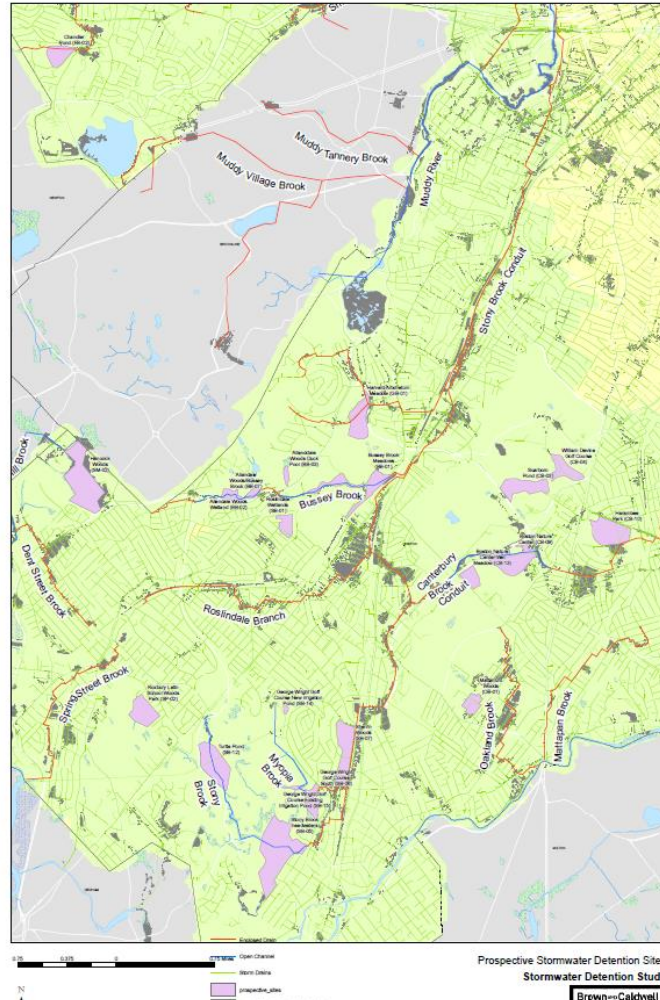


# Outfall Inventory – 586 – Commission GIS

BPRD – 5  
BWSC - 271  
CAT - 1  
DCR - 53  
DOT - 27  
MBTA - 1  
MHD - 29  
Milton - 1  
MPA - 11  
MWRA - 15  
Private - 172



# Stormwater Detention



# CHALLENGE:

## RISKS OF FLOODING WITH SEA LEVEL RISE AND STORM SURGE – YEAR 2060

YEAR 2060 RAIN  
SEA LEVEL RISE, NO STORM SURGE



YEAR 2060 RAIN  
SEA LEVEL RISE, WITH STORM SURGE

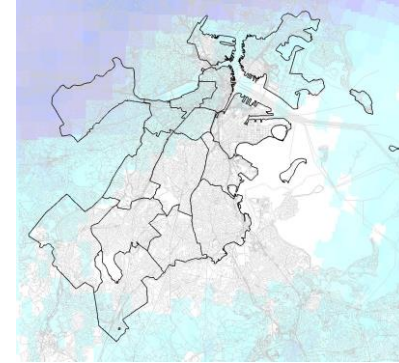


# Inundation Model - Project Overview

1. Develop 2D model that will estimate and graphically display inundation information using most current projections available.
2. Model will allow identification of land area, buildings and roads impacted by major events.
3. Model can be used as an early warning tool to pre-evacuate potentially impacted areas.
4. Estimate the projected depth and duration of inundation
5. Estimate potential population impacted
6. Identify critical facilities impacted by inundation
7. Utilize model as a collaboration tool with other agencies with data available and accepted by other entities
8. Have the information Peer Reviewed by outside entity.



# Boston – Coastal and Stormwater Flooding



*The Inundation Model considers the impact of **coastal flooding** and **inland stormwater flooding***

# Wet Weather Events

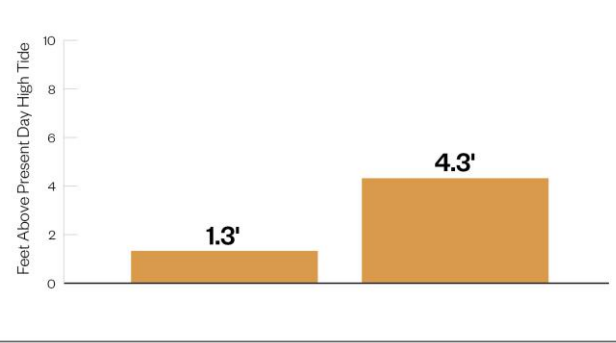
## Thunderstorm

### Storm Motion

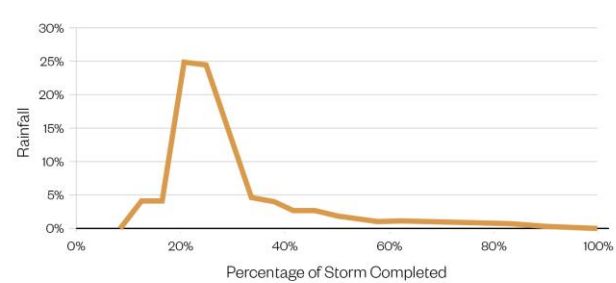


Storm Direction: **66.0 degrees | Northeast**  
Speed: **25 miles per hour**

### Sea Level Rise (SLR)



### Storm Accumulation



# Wet Weather Events

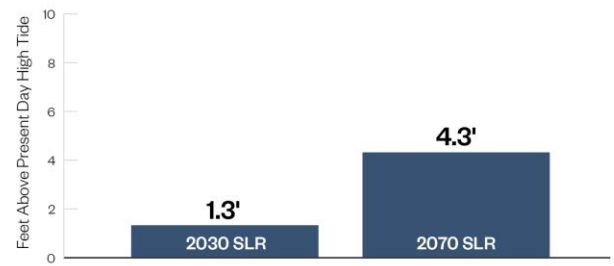
## Frontal

### Storm Motion

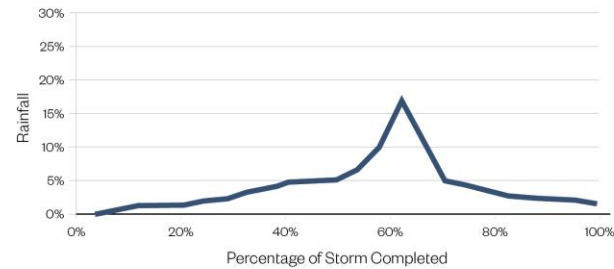


Storm Direction: **56.3 degrees | Northeast**  
Speed: **26.4 miles per hour**

### Sea Level Rise (SLR)



### Storm Accumulation

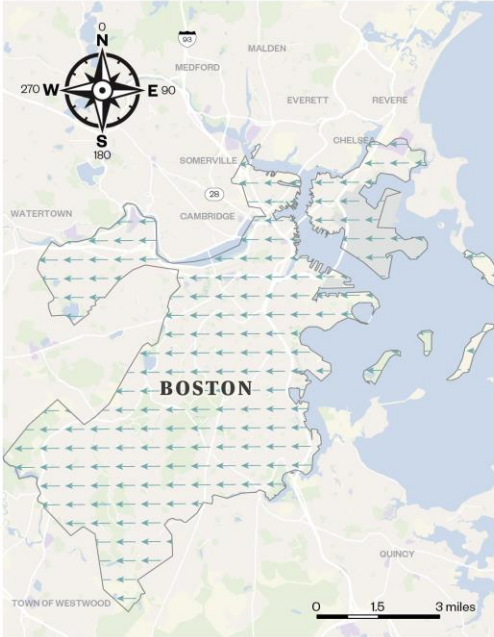




# Wet Weather Events

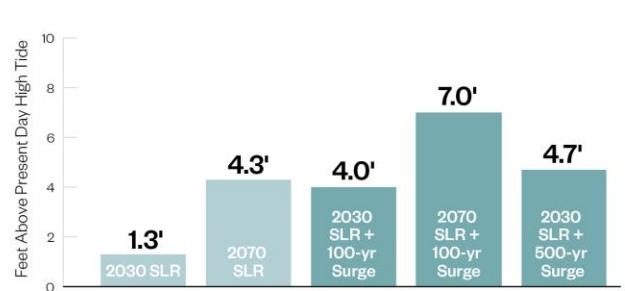
## Nor'easter

### Storm Motion

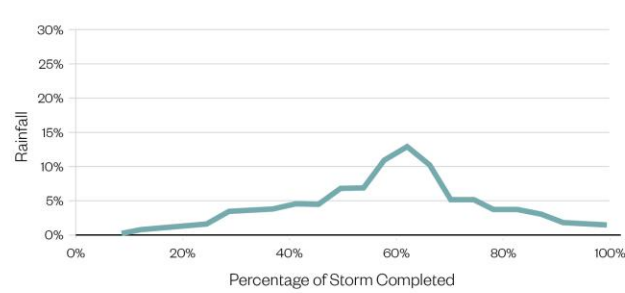


Storm Direction: **270.0 Degrees** | West  
Speed: **21.1 miles per hour**

### Sea Level Rise (SLR) and Storm Surge



### Storm Accumulation



# Wet Weather Events

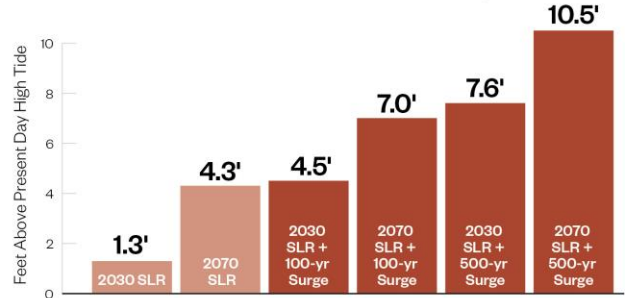
## Tropical

### Storm Motion

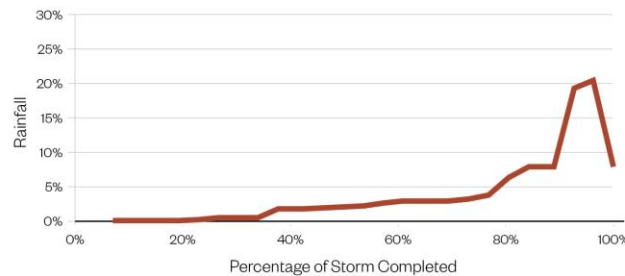


Storm Direction: **270.0 Degrees | West**  
Speed: **24.8 miles per hour**

### Sea Level Rise (SLR) and Storm Surge

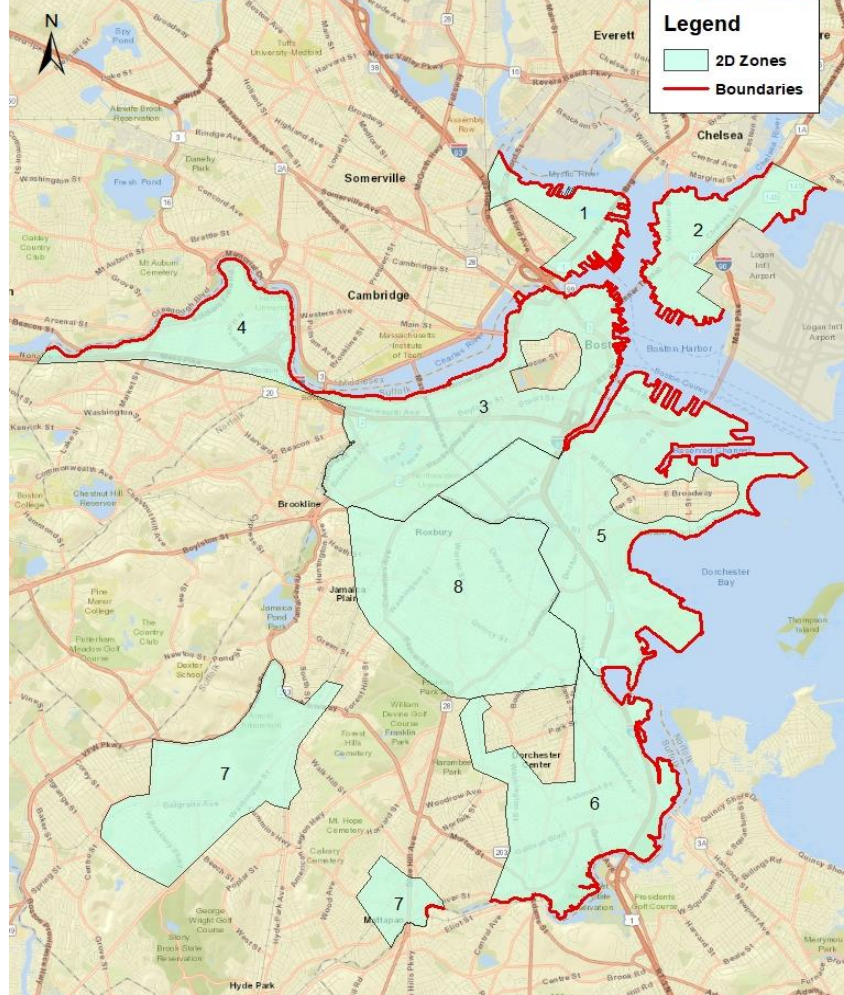


### Storm Accumulation



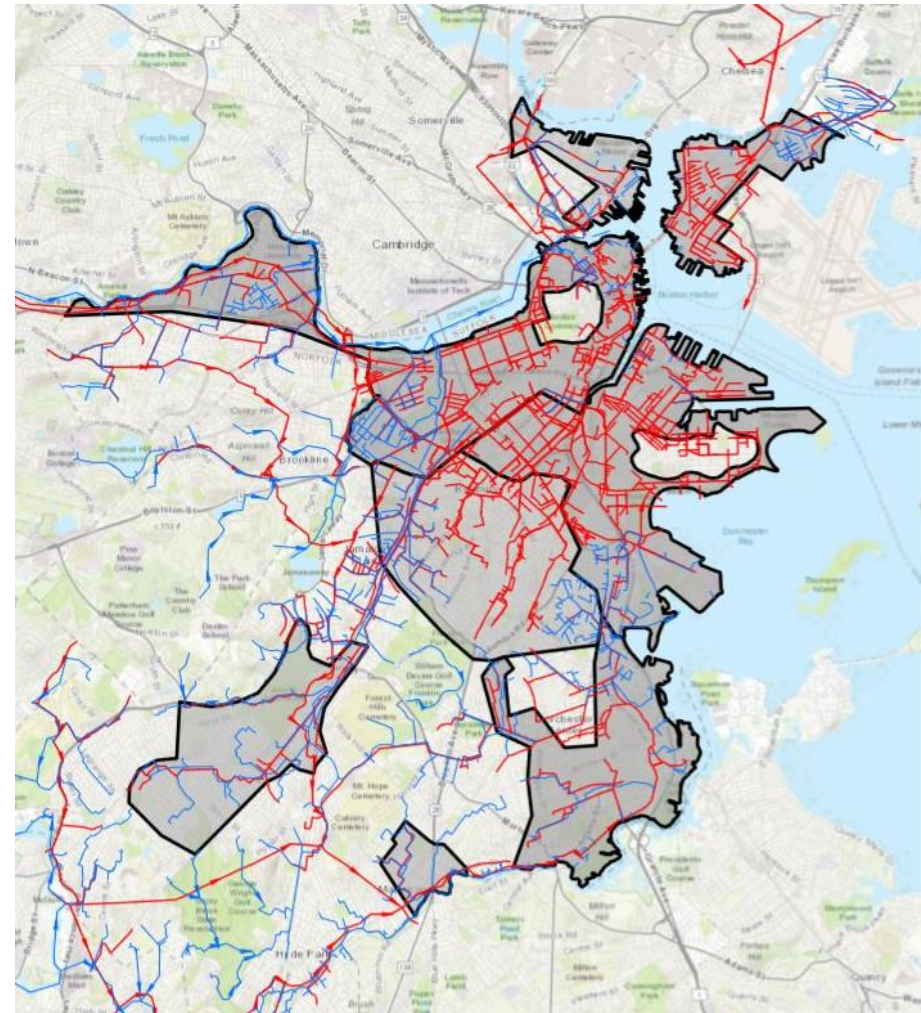
# 2D Waterfront Boundaries

Tidal conditions applied along all waterfront boundaries



# Extent of Citywide Model

Red = 1D sewer model  
Blue = 1D drain model  
Gray = 2D model zones

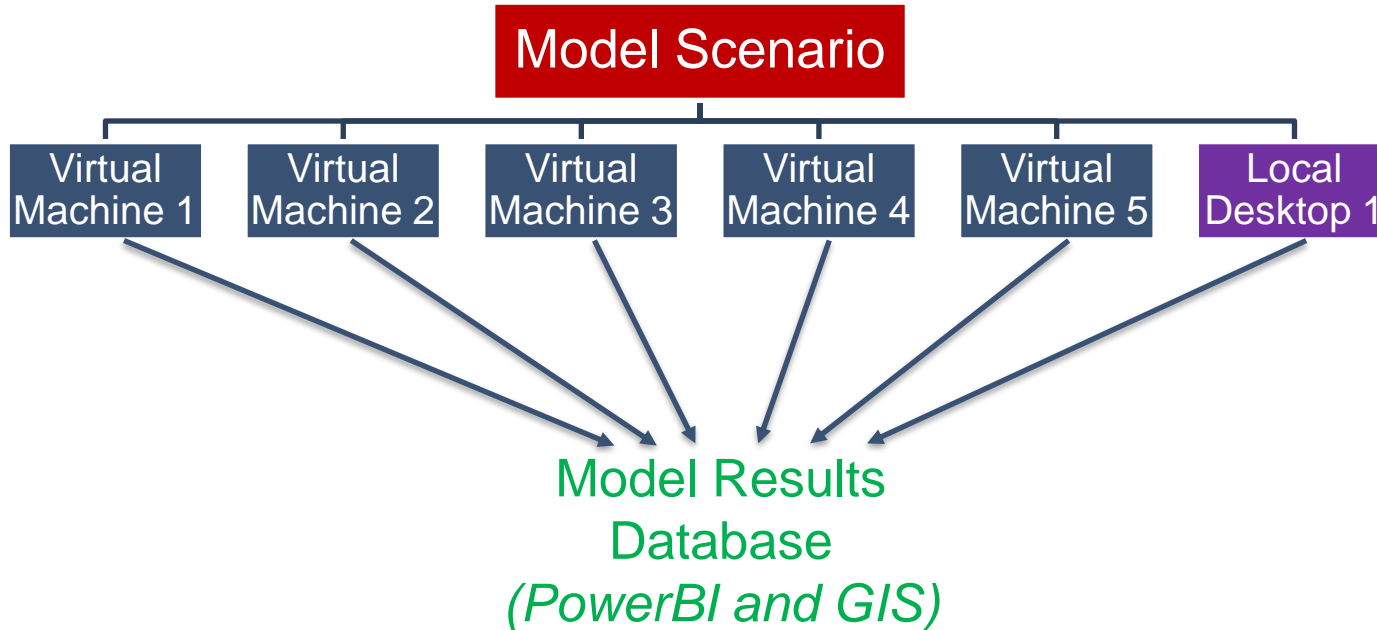




# Simulation Strategy

Challenge: Model Run Time – Simulating a 48-hour storm requires almost 5 days

Solution: Utilize multiple virtual machines to run different 2D models simultaneously – avoided over 365 days of continuous model simulation time!

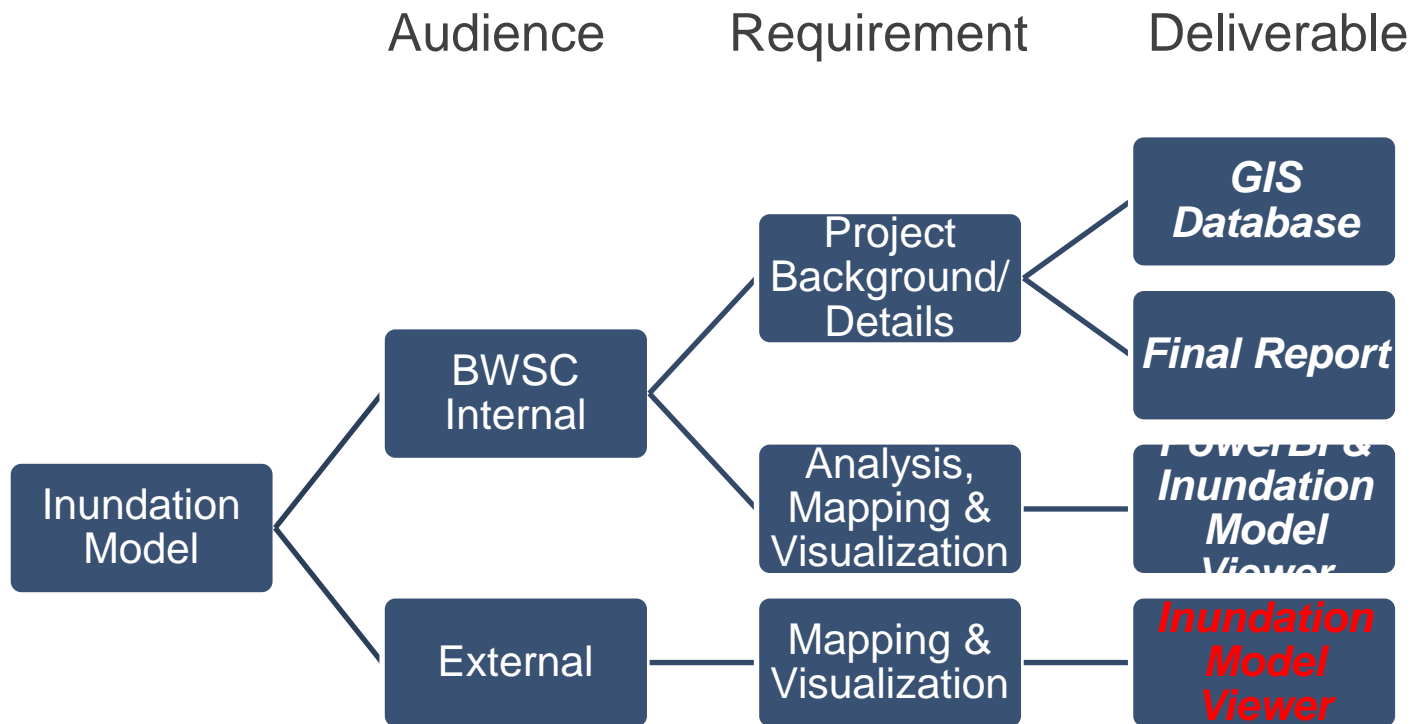


# Inundation Model Analysis



Emergency Centers	EMS/ Fire Stations	Government Building	Health Facilities	Police Departments	Schools
4	6	1	6	2	9
0	1	1	3	0	4
3	13	1	53	4	123
5	6	6	19	6	11
4	6	3	26	1	30
2	1	0	6	1	3
1	4	1	14	1	10

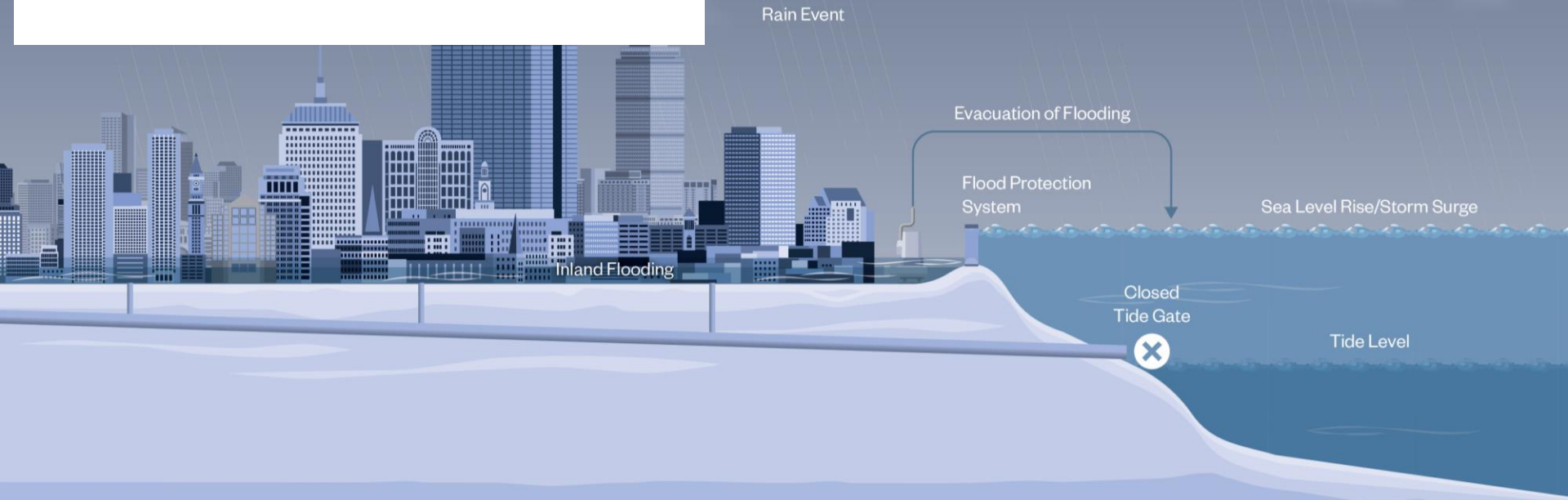
# Interpretation of Model Results





## Next Steps

- Evaluate coastal infrastructure
- Plan for stormwater discharge
- Continue development of tools for education/communication
- Stakeholder coordination



# Acknowledgements

## ***Boston Water & Sewer Commission***

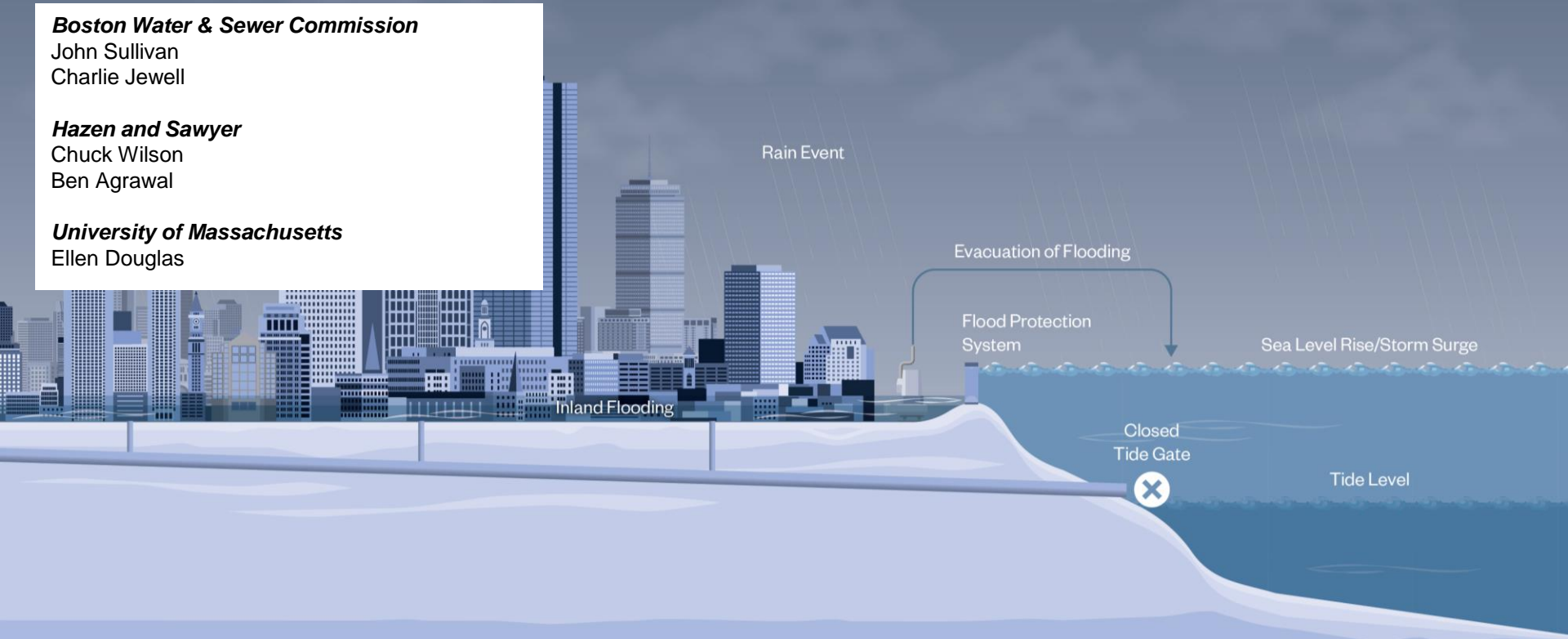
John Sullivan  
Charlie Jewell

## ***Hazen and Sawyer***

Chuck Wilson  
Ben Agrawal

## ***University of Massachusetts***

Ellen Douglas



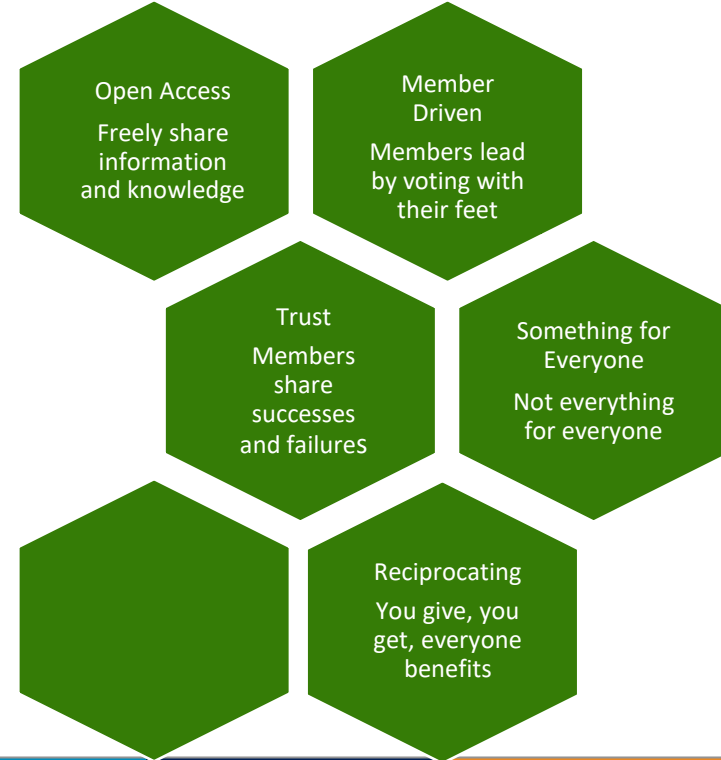
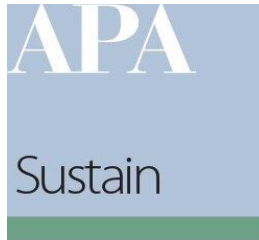
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## Adaptation Co-Creation Series

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### *Speaker Transition*



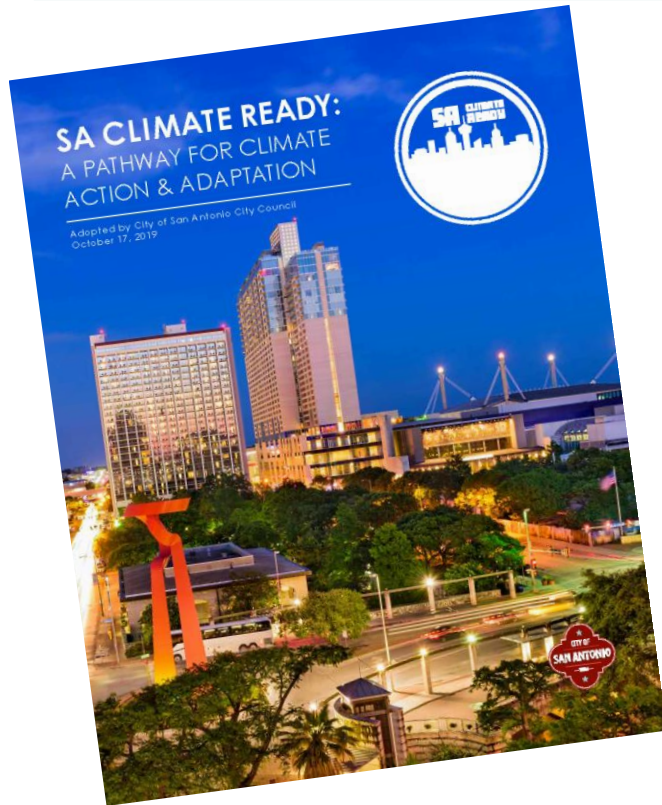
SA Climate Ready  
Education & Empowerment



Julia Murphy, AICP  
Deputy Chief Sustainability Officer

**June 29, 2021**

# Education & Empowerment: Essential to Climate Action in San Antonio



“Educating residents and businesses about climate action as well as enabling San Antonians to make behavioral and technological changes is an essential element of reducing greenhouse gas emissions. This can be accomplished through policy, training, incentives, financing, and tracking.”

- 28 Community mitigation strategies,
- 13 Municipal mitigation strategies
- 45 Adaptation strategies
- Emphasis on climate equity
- Co-benefits include air quality, ecosystem services, quality jobs, health outcomes, affordability

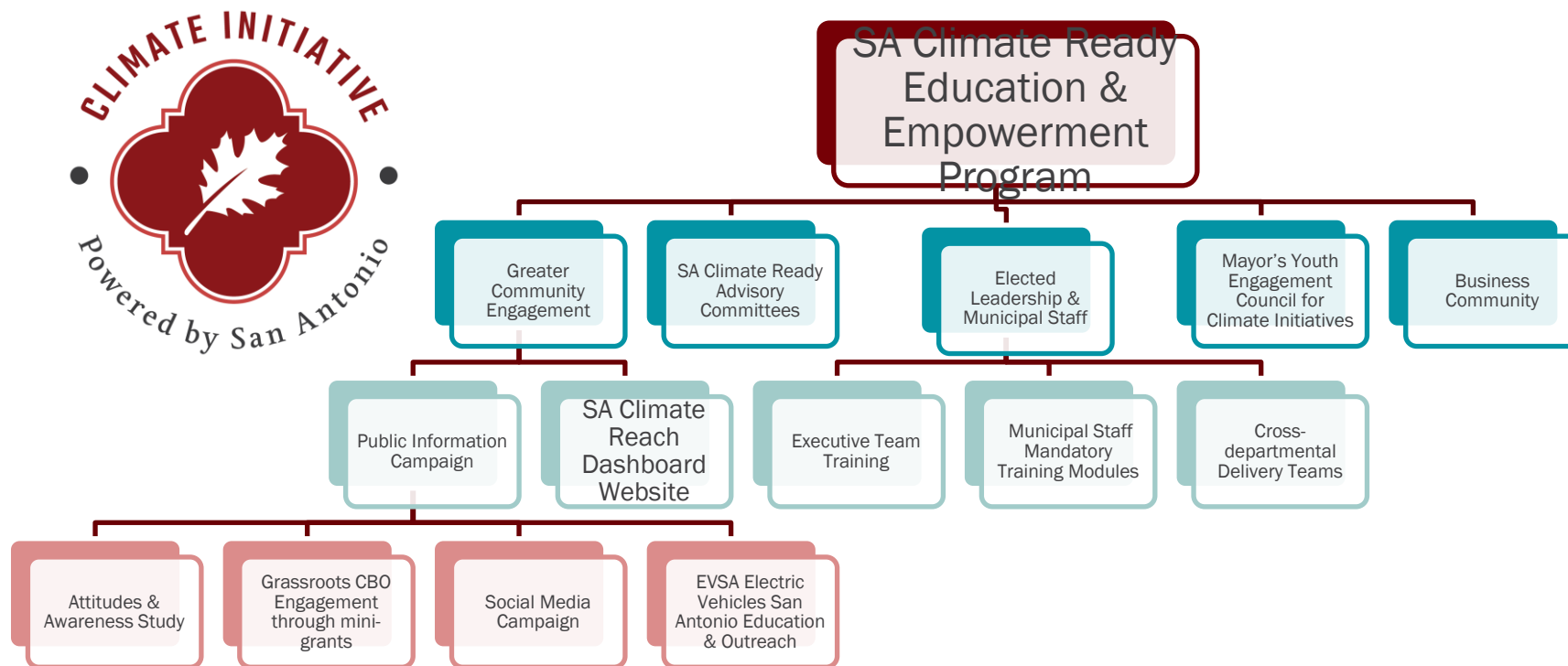


# Goals of Climate Education & Empowerment

- **Align** around a shared vision for implementing the CAAP
- **Understand the context** of climate change and what it means for San Antonio, including what might happen if no action is taken
- **Speak clearly and fluently** about the CAAP (and develop talking points for key constituencies)
- **Guide current and future** policies, projects, programs and budgets to maximize efficiency and accelerate outcomes



## Multi-faceted Climate Education Program







# Municipal Climate Training Platform

## Executive Team Training

Establish a shared and personal vision for SA Leadership on the CAAP value to SA through live facilitated webinars

### Executive Team

Introduction

Potential Impact to City assets & operations

Climate Action across the U.S.

Implementation Scenarios

Reflections & Next Steps

## Delivery Team Training

Supporting the Delivery Team in developing a plan to implement the CAAP strategies through live and recorded sessions

### Delivery Team

Introduction

Climate Projections for SA

Potential Impact to City assets & operations

Overview of Effective Implementation Strategies in US & European Cities

Increase Carbon Free Energy

Reduce Building Energy Consumption

Reduce Transportation Consumption

Promote Biodiversity & Healthy Ecosystems

Adaptation Strategies

Activity Session – Individual Action Plan

Reflections & Next Steps

## All CoSA Staff

Building awareness and capacity for all SA City staff through mandatory online training modules

### All CoSA Staff

Introduction to the SA CAAP

Urgent need, topics, desired outcomes, etc.

CC action, adaptation and social equity

Link to the CAAP Climate Equity Indicator and the public engagement process

Understanding GHGs

Detail of SA's GHG inventory, sources and change over time. CoSA strategies that result in fewer emissions.

Climate shocks and stresses

Deeper look at urban systems thinking and understanding shock disruptors and chronic stresses

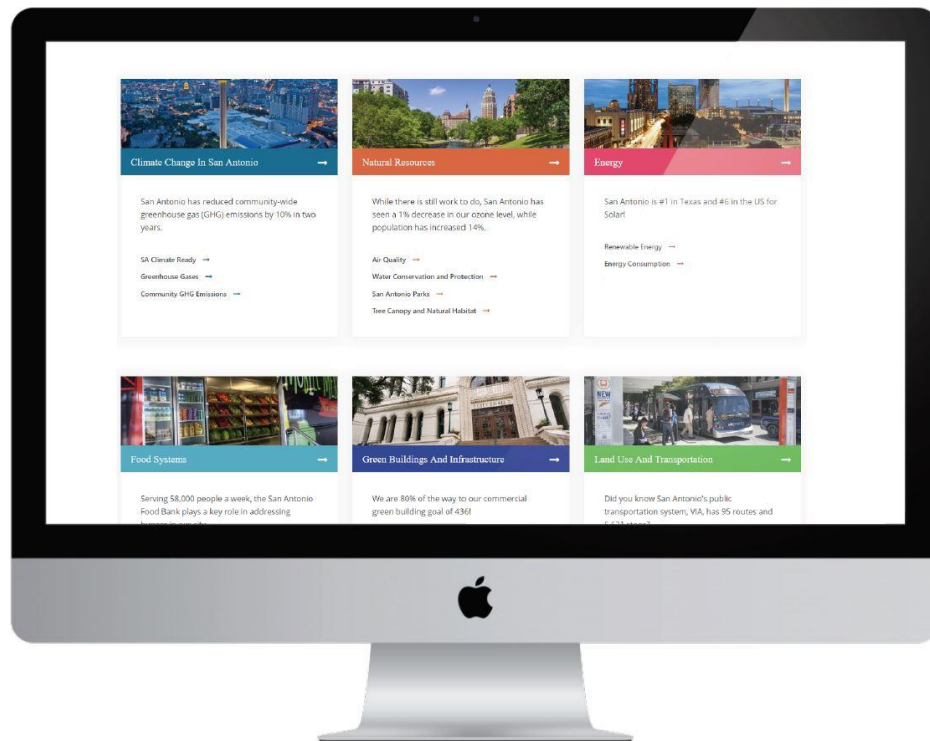
Resilience Dividend

Focus on co-benefits of integrated solutions (complexity of cross-sector solutions)

Onboarding Session

Intro to the SA CAAP for New Hires

# SA Climate Ready Sustainability Dashboard



[www.sasustainability.com](http://www.sasustainability.com)

[www.sanantonio.gov/sustainability](http://www.sanantonio.gov/sustainability)

[Julia.murphy@sanantonio.gov](mailto:Julia.murphy@sanantonio.gov)

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## Reflection & Discussion

**Karla Ebenbach**

*Secretary-Treasurer, American Planning Association  
Sustainable Communities Division President, Ebenbach  
Consulting*

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# Thank you to our experts!

*Charlie Jewell, Boston Water & Sewer Commission (BWSC)*

*Benjamin Agrawal, Hazen & Sawyer*

*Chuck Wilson, Hazen & Sawyer*

*Kim Lundgren, KLA Founder and President*

*Julia Murphy, City of San Antonio*

*Karla Ebenbach, Ebenbach Consulting/ APA Sustainable Communities Division*



# Get Involved!

Interested in presenting in a future  
Co-Creation Webinar Session?

Contact Beth Gibbons at  
[Bgibbons@adaptpros.org](mailto:Bgibbons@adaptpros.org)

Or share your project:

<https://forms.gle/d73avFjsDfmaPdxc7>

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*Co-Creation Webinar Series*  
*Building Resilience: Design Solutions*  
*August 2021*

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*Climate Service Provider Academy*  
*October 14 - 28*

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*Co-Creation Webinar Series*  
*Designing Utilities of the Future*  
*October 2021*

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# Join Us

When you become a member of ASAP, you get access to our resources as well as our network of professionals who are tackling climate change challenges every day, just like you.



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- ❑ Individual Memberships begin at \$150
- ❑ Customized Sponsorships & Organizational Packages that fit any need and budget.

# The climate is changing.

Now is the time for action. This is the place for you.

**Join Us**



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Beth Gibbons, [Bgibbons@adaptpros.org](mailto:Bgibbons@adaptpros.org)