



Metropolitan **Planning** Council

80 Years of **Reinventing** the Region

Smart Systems, Resilient Regions

Tuesday, May 20, 2014

#smartsystems

Wi-Fi: **MPC Guest** Password: **mpcwireless**

Siemens Building Technologies Division

MATTHIAS REBELLIUS

Homeland Security and Emergency Management for Cook County

MICHAEL MASTERS

Siemens Infrastructure & Cities

ALISON TAYLOR

SIEMENS

Building Resilience in Cities & Infrastructure

[siemens.com/answers](https://www.siemens.com/answers)

5 Characteristics of Resilient Infrastructure



ROBUSTNESS



REDUNDANCY



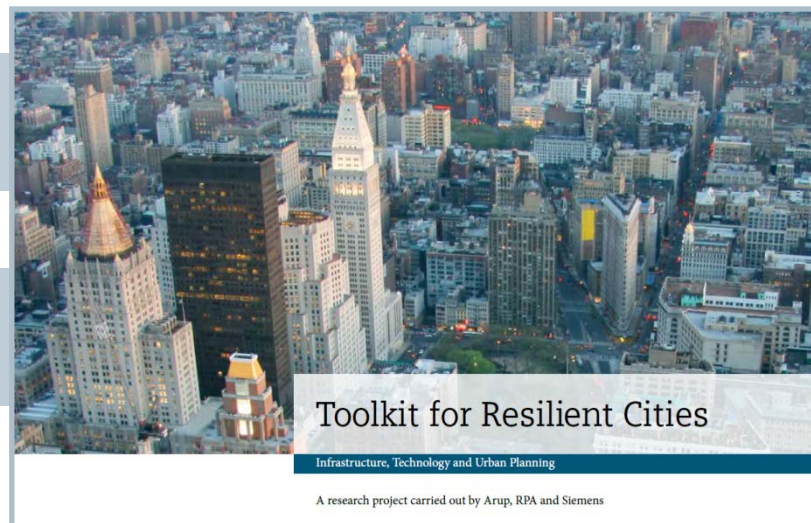
DIVERSITY AND FLEXIBILITY



RESPONSIVENESS



COORDINATION

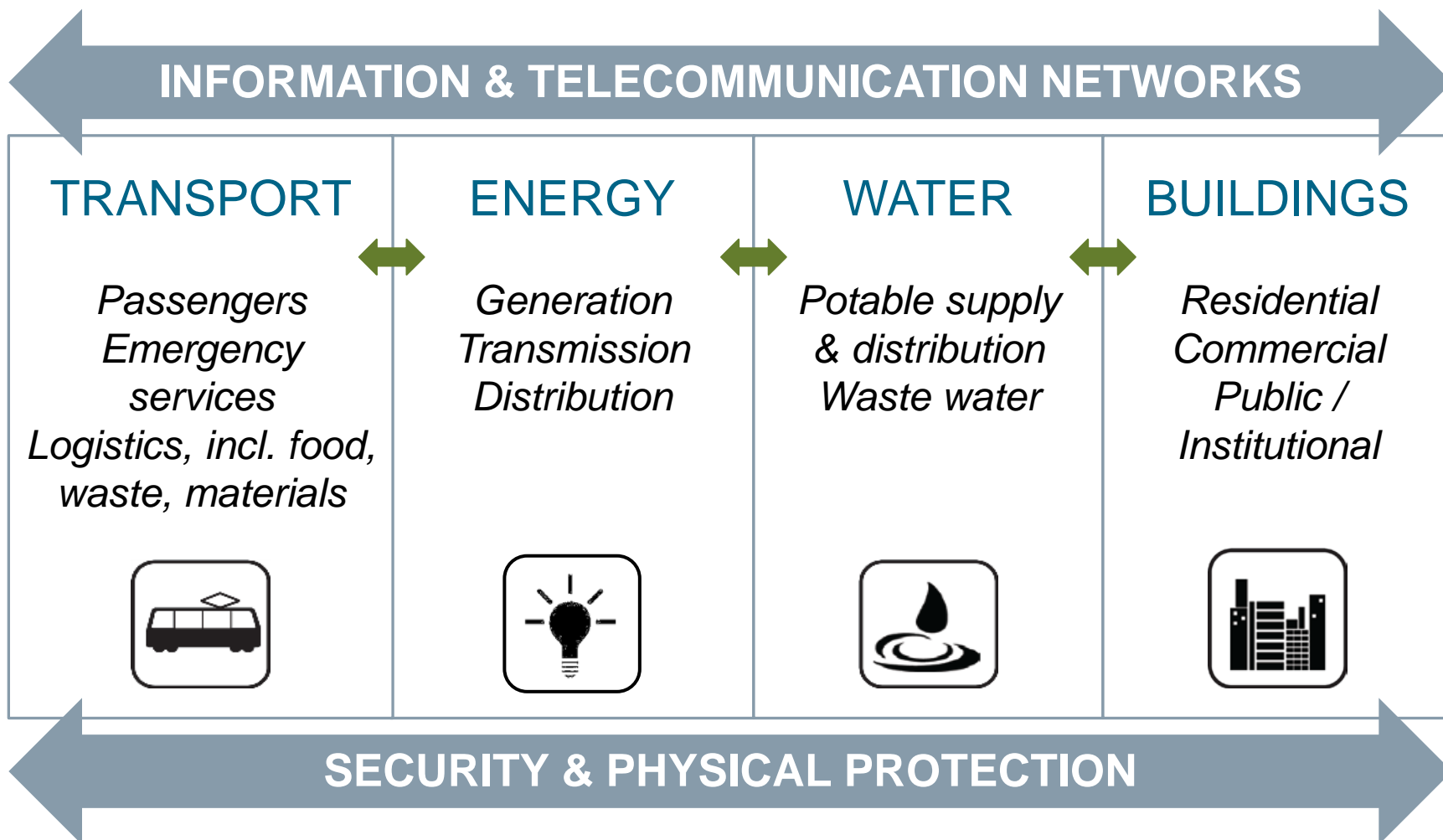


Toolkit for Resilient Cities

Infrastructure, Technology and Urban Planning

A research project carried out by Arup, RPA and Siemens

Focus on Energy, Transport, Water



The Transportation Network

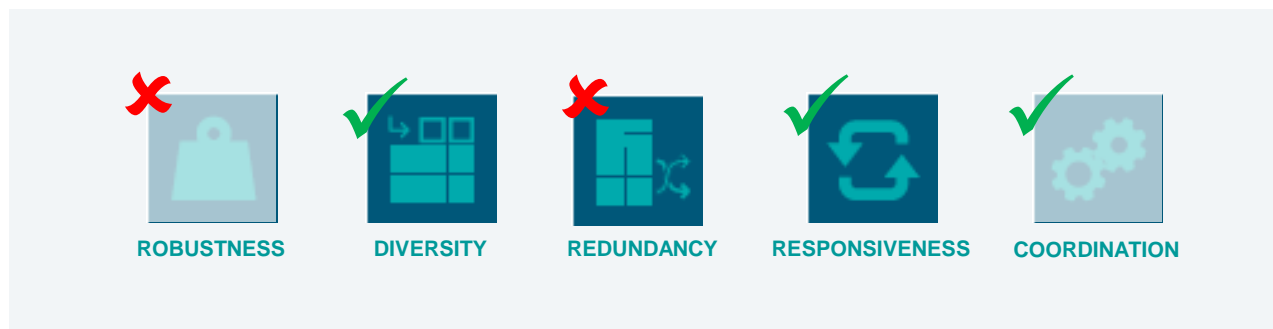




Train Control System (CBTC)

Automatic, punctual & safe operation of trains

- **Automatic train control to optimize track usage**
- **Short distance between cars for increased capacity**
- **Flexibility in extreme traffic situations**
- **Increase of capacity in stress situations and peak load**



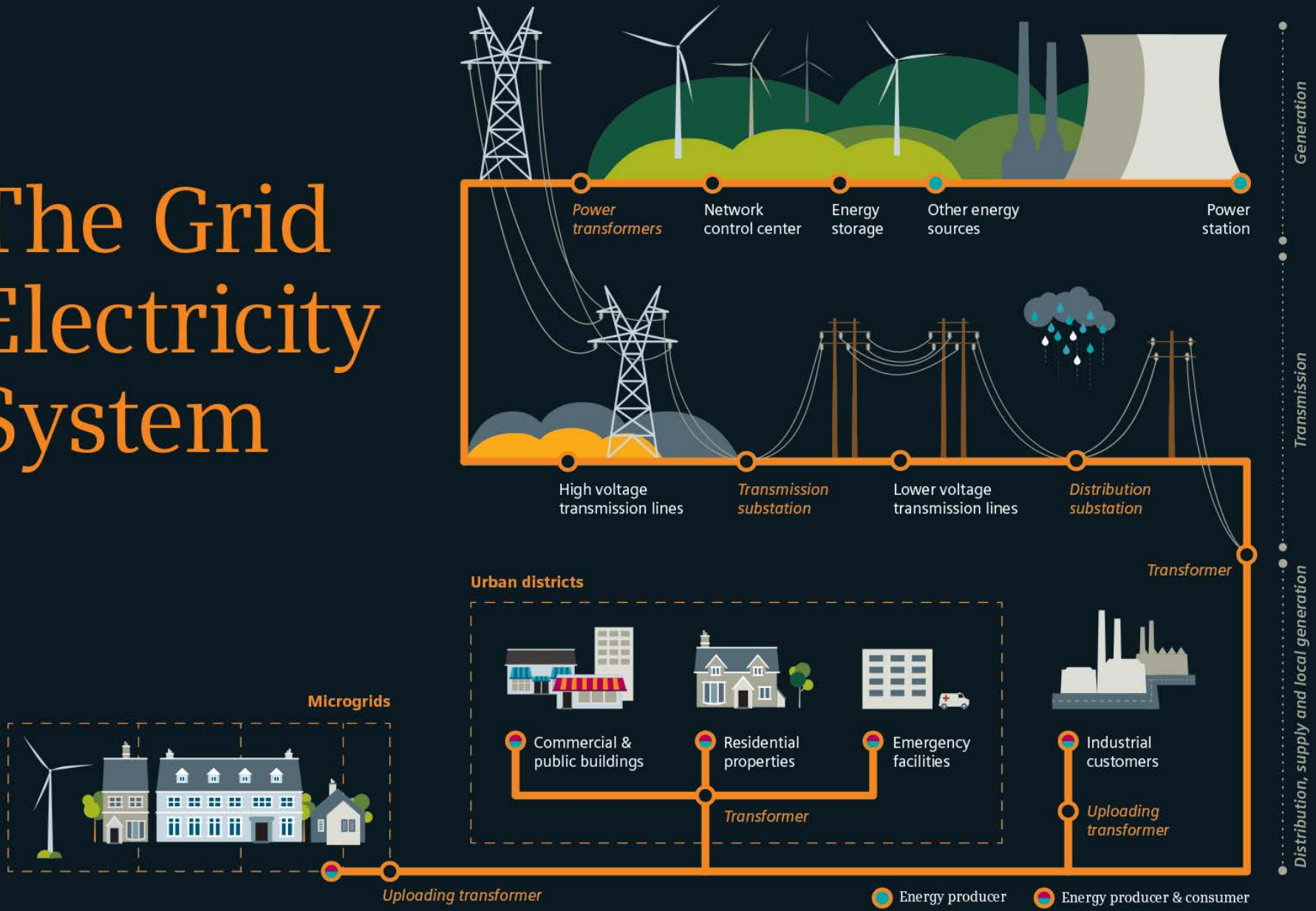
Vehicle-to-Infrastructure Communications

Houston, Texas

- **Traffic lights & vehicles communicate**
- **Real-time estimates of vehicles on the road; their speeds**
- **During evacuation, allows drivers to choose route with shortest travel time**
- **Traffic lights can detect emergency vehicles**



The Grid Electricity System

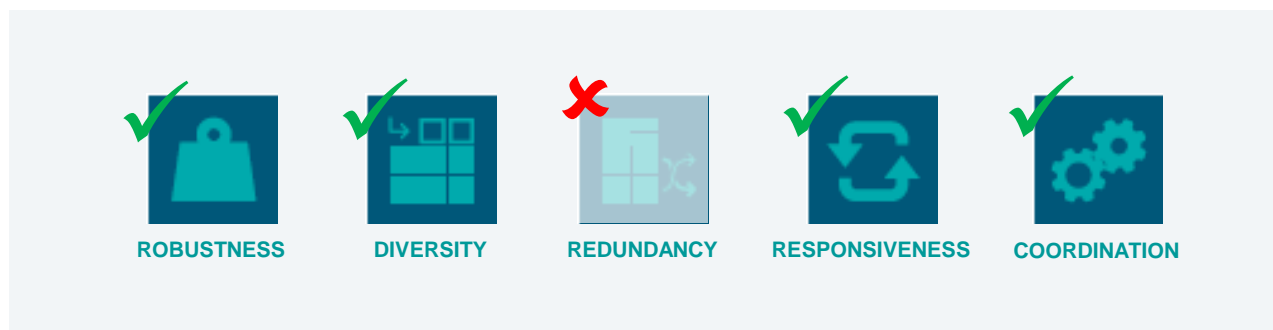




Gas Insulated Switchgear (GIS)

Allows for power system reliability and safety

- **Increases automation level**
- **Encapsulated**
- **Elevated placement**
- **Less maintenance**
- **Detection of technical losses**



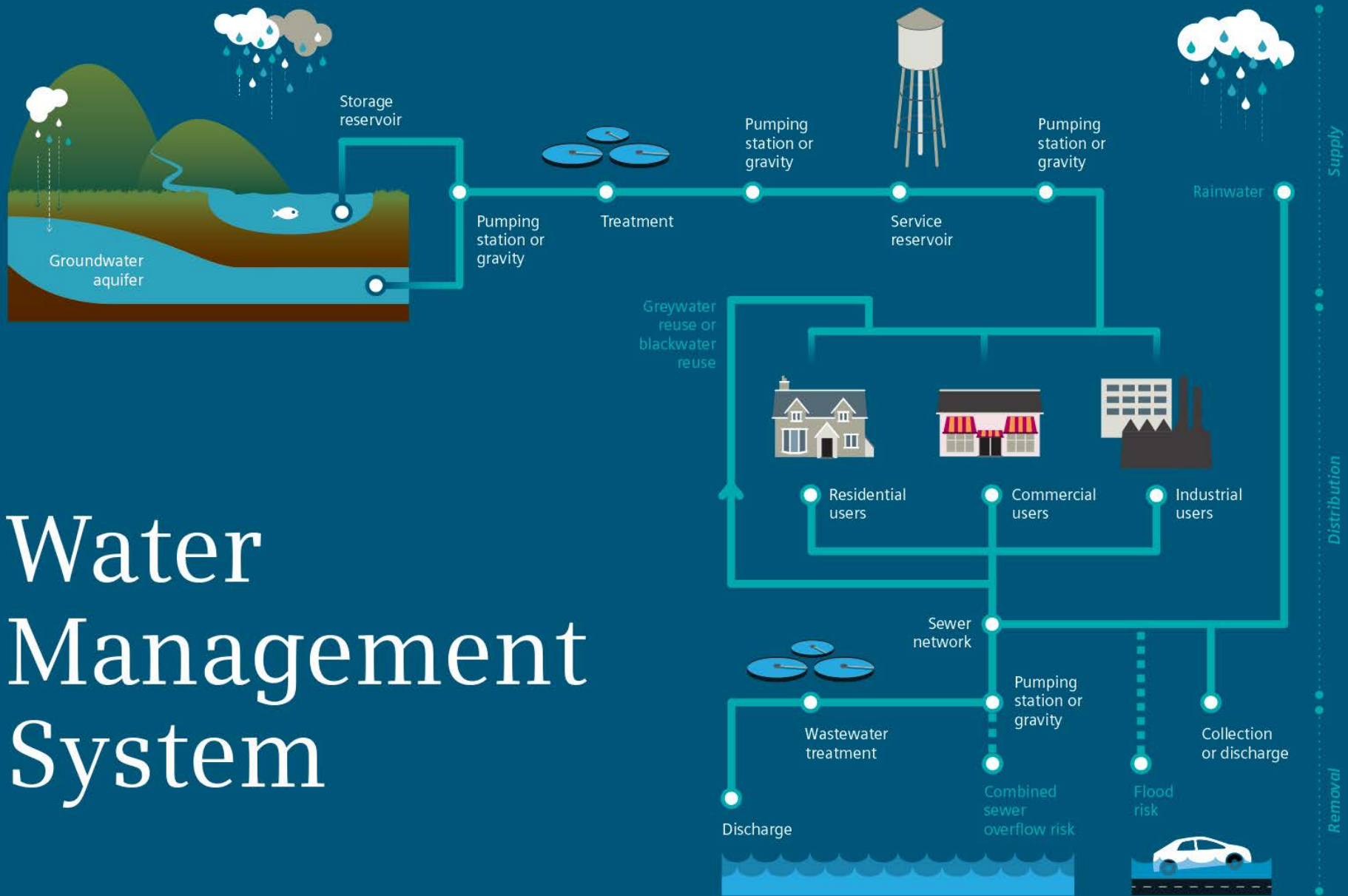
CO-OP City

Bronx, New York City

- **14,000 apartments**
- **35 high-rise buildings**
- **40MW steam turbine generator, plus Combined Heat & Power**
- **Operates on a micro grid**
- **Retained power for 60,000 residents**



Water Management System



Real-time Levee Monitoring System

Livedijk, Netherlands

- **Internet-based early warning system**
- **Sensors buried in dike measure water height/pressure, moisture, temperature**
- **Seasonal & daily weather phenomena are integrated within the evaluation**
- **First coastal levee that can be monitored online**



Water System Improvement Program (WSIP)

San Francisco, California

- **Harden infrastructure, add redundancy and increase monitoring and automation**
- **From dams, reservoirs, pipelines, & tunnels to treatment facilities & pump stations**
- **Ensure that the system can deliver water to 2.4 million people**



Building Systems



Coordinating Human Reactions to Hazards

Alberta, Canada

- **Mass Notification Systems delivers targeted messages during a crisis**
- **System contacts people inside and outside of the building, and directly via personal devices such as cell phones**
- **Systems inform occupants about what action they should take**



Advanced Evacuation Planning

London, United Kingdom

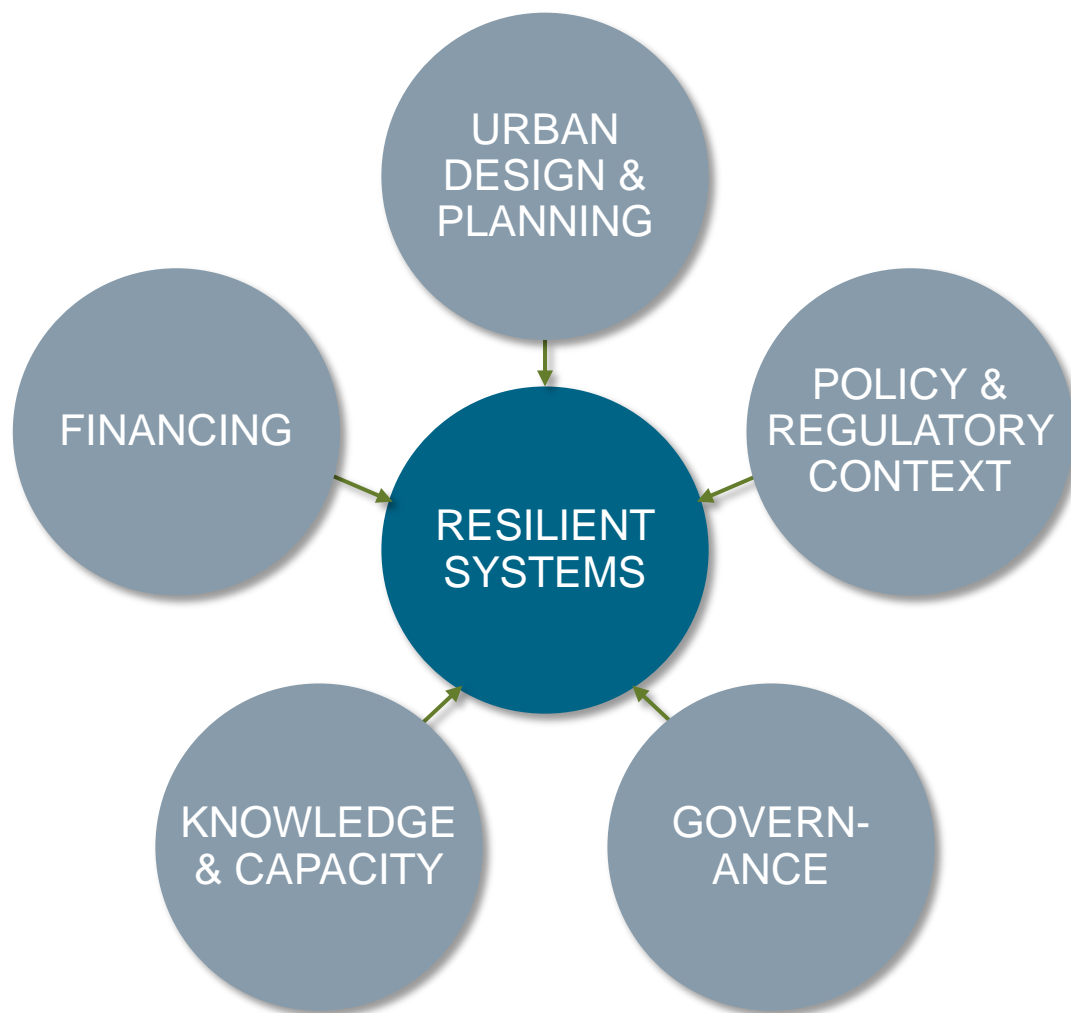
- **Modeling behavior of building occupants during an emergency**
- **Software enables movement through a building faster than real time, including places where blockages may occur**
- **Tool improves human preparedness, coordination and response**

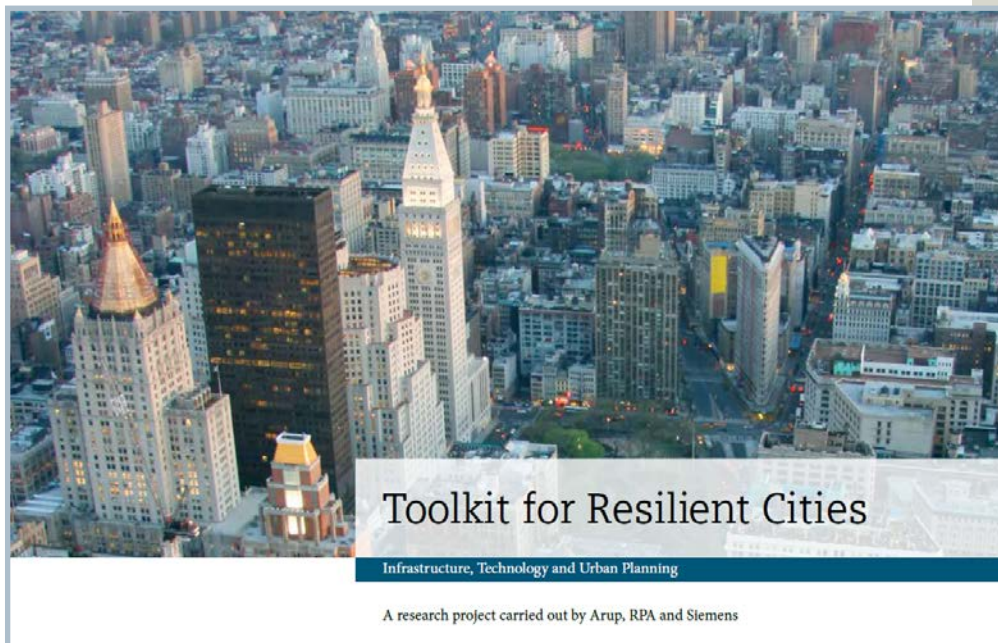


SIEMENS

Creating an Enabling Framework

An Enabling Framework For Resilient Systems





Thank you!

To download the *Toolkit for Resilient Cities*, visit:

www.siemens.com/sustainable-cities

Hazards Planning Research Center, American Planning Association

JAMES SCHWAB

Planning for Resilience

James C. Schwab, AICP
Manager, Hazards Planning Research Center
American Planning Association

Metropolitan Planning Council Roundtable
"Smart Systems, Resilient Regions"
Tuesday, May 20, 2014
Chicago

Due out by
September

Planning for Post-Disaster Recovery: Next Generation



James C. Schwab, AICP, Editor



American Planning Association
Planning Advisory Service
Report Number 577

Making Great Communities Happen

Hazard Mitigation:

Integrating Best Practices into Planning



James C. Schwab, Editor



American Planning Association

Planning Advisory Service
Report Number 560

Download at:

[http://www.fema.gov/
media-library-
data/20130726-1739-
25045-
4373/pas_560_final.p
df](http://www.fema.gov/media-library-data/20130726-1739-25045-4373/pas_560_final.pdf)

Order print copy:

[http://www.planning.or
g/store/books/](http://www.planning.org/store/books/)

Hazard Mitigation: Major Themes

- Value of integrating hazard mitigation as planning priority in all aspects of local planning process
- Focus on “strategic points of intervention”
 - Visioning and goal setting
 - Plan making, esp. comprehensive plans
 - Implementation tools (zoning, subdivision regs)
 - Development work (site plan review, redevelopment, etc.)
 - Capital programming
- Use of Safe Growth Audit as implementation tool
 - Described in Chapter 5

ZP issue available as free download at:
<http://www.planning.org/nationalcenters/hazards/>

ZONING PRACTICE

OCTOBER 2009

AMERICAN PLANNING ASSOCIATION

➔ ISSUE NUMBER 10

PRACTICE SAFE GROWTH AUDITS



EVACUATION
ROUTE

KEY QUESTIONS

COMPREHENSIVE PLAN

Land Use

- Does the future land-use map clearly identify natural hazard areas?
- Do the land-use policies discourage development or redevelopment within natural hazard areas?
- Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?

Transportation

- Does the transportation plan limit access to hazard areas?
- Is transportation policy used to guide growth to safe locations?
- Are movement systems designed to function under disaster conditions (e.g., evacuation)?

Environmental Management

- Are environmental systems that protect development from hazards identified and mapped?
- Do environmental policies maintain and restore protective ecosystems?
- Do environmental policies provide incentives to development that is located outside protective ecosystems?

Public Safety

- Are the goals and policies of the comprehensive plan related to those of the FEMA Local Hazard Mitigation Plan?
- Is safety explicitly included in the plan's growth and development policies?
- Does the monitoring and implementation section of the plan cover safe growth objectives?

ZONING ORDINANCE



ing ordinance conform to the comprehensive plan in terms of discouraging or redevelopment within natural hazard areas?
 ance contain natural hazard overlay zones that set conditions for land h zones?
 ocedures recognize natural hazard areas as limits on zoning changes that ntensity or density of use?
 ance prohibit development within, or filling of, wetlands, floodways, and

REGULATIONS

ision regulations restrict the subdivision of land within or adjacent to l areas?
 ions provide for conservation subdivisions or cluster subdivisions in order ivironmental resources?
 ions allow density transfers where hazard areas exist?

DEVELOPMENT PROGRAM AND INFRASTRUCTURE POLICIES

al improvement program limit expenditures on projects that would elopment in areas vulnerable to natural hazards?
 ire policies limit extension of existing facilities and services that would elopment in areas vulnerable to natural hazards?
 al improvement program provide funding for hazard mitigation projects re FEMA Mitigation Plan?

or corridor plans recognize the need to avoid or mitigate natural hazards?
 ling code contain provisions to strengthen or elevate construction to ard forces?
 evelopment or redevelopment strategies include provisions for ural hazards?
 ighted evacuation and shelter plan to deal with emergencies from natural

Planning for Post-Disaster Recovery: Next Generation

Major themes:

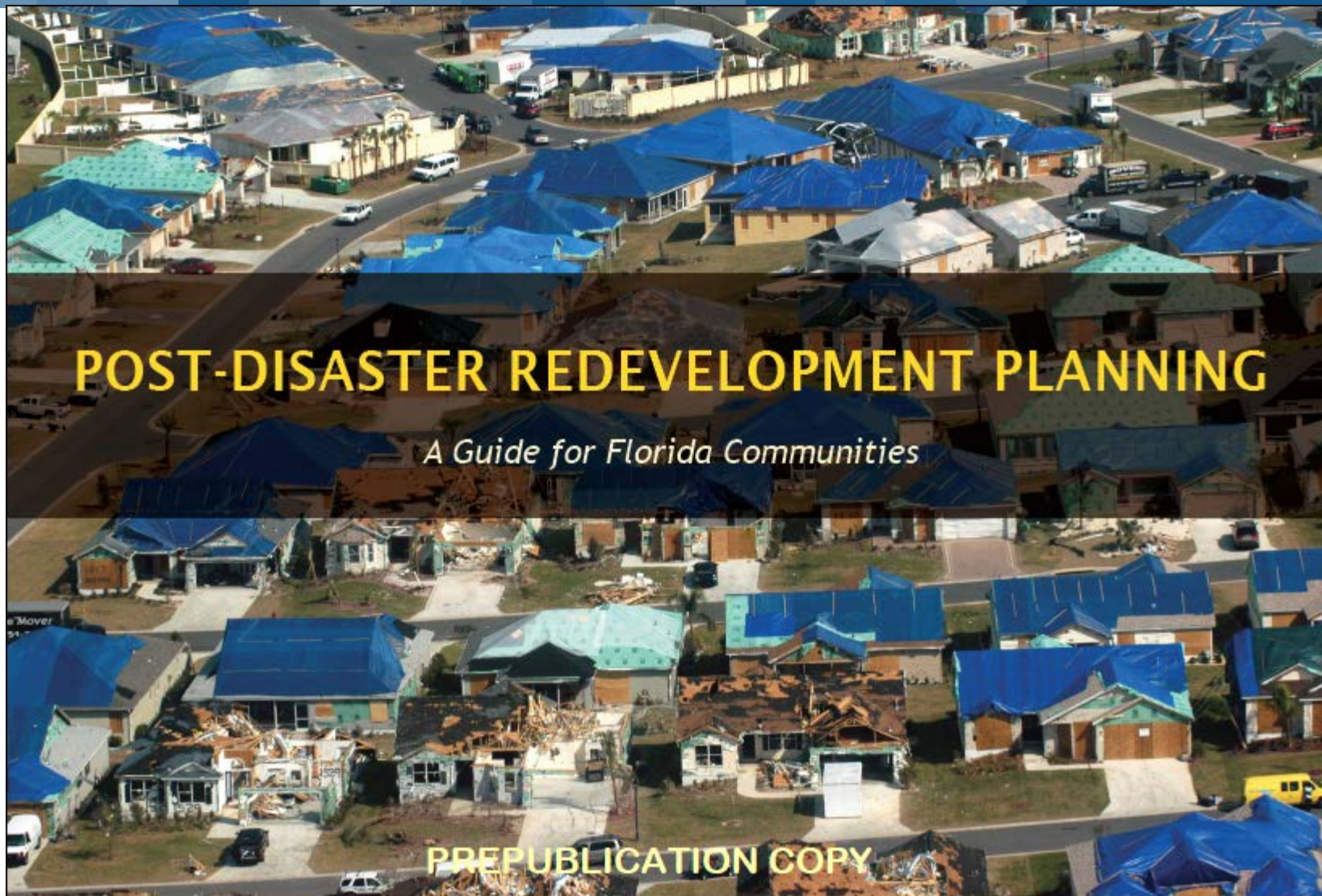
- Resilience in local governance
- Green infrastructure and climate change
- Pre- and post-disaster planning structures
- Model pre-event recovery ordinance
- Understanding the new federal structure
- Recovery Plans (Chapters 5-7):
 - Goals and Policies
 - Planning Process
 - Implementation

Typology of Recovery Plans

- Operational (pre-disaster)
 - Focus primarily on response and short-term recovery
- Policy (pre-disaster)
 - Establishing priorities for recovery in event of a disaster
 - Managerial structure for long-term recovery
- Post-disaster
 - Focus on urban design and redevelopment based on knowledge of actual pattern of damage from event

Advantages of Pre-Event Planning for Disaster Recovery

- *Building a Local Culture of Disaster Awareness*
- *Providing a Focus for Pre-Disaster Exercises*
- *Opportunity to Establish Clear Lines of Responsibility*
- *Opportunity to Consider and Review Financial Needs*
- *Assessment of Overall Preparedness Stance*



POST-DISASTER REDEVELOPMENT PLANNING

A Guide for Florida Communities

PREPUBLICATION COPY



Countywide
**Post-Disaster
Redevelopment Plan**



Building Back for a Stronger Tomorrow

What Must Wait?

- Pre-event planning saves time, prevents confusion
 - But it cannot answer questions that can only be confronted after the fact
- Damage assessments establish scope and location of damage as result of disaster
- Post-disaster plans must include effective public participation to achieve consensus & buy-in
- Plan can then focus on rebuilding and urban design for most affected areas based on actual needs

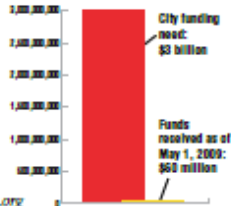
Our Flood Recovery Needs

- **Federal Funding** – To accomplish all the components of this plan, the City needs approximately \$3 billion in state and federal funding.
- **Public Participation** – Thank you for participating in the development of the Flood Management Plan, for permanent floodwalls and levees along the Cedar River, and the Neighborhood Reinvestment Plan, for rebuilding our flood-damaged neighborhoods. The City needs your input as we develop a plan to rebuild and replace flood-damaged community facilities. Please participate in the open houses during the summer of 2009.
- **Community Partnerships** – The City has built strong partnerships with community organizations so that we can solve our community's problems together. These local partners include neighborhood associations, the chamber of commerce, the downtown district, nonprofit organizations, landlords, small business owners and many more.



How You Can Help

- 1) Participate in one of the City's public meetings and open houses
- 2) Volunteer to help rebuild houses in our community
- 3) Donate money to local nonprofit organizations that help flood survivors
- 4) Contact your state and federal legislators and ask for support of our flood recovery efforts
- 5) Share your ideas and solutions with us by calling (319) 286-5080 or email us at citymanager@cedar-rapids.org



More than 1,400 community members participated in the Neighborhood Planning Process, volunteering more than 6,000 hours of planning time.

THE CEDAR RAPIDS CITY COUNCIL

Left to right: Kris Gulick, Justin Shields, Mayor Kay Halloran, Tom Podzimek, Mayor Pro Tem Brian Fagan, Pat Shey, Monica Vernon, Jerry McGrane, and Chuck Wienke.



CITY HALL
3851 River Ridge Drive NE
Cedar Rapids, IA 52402
(319) 286-5080
www.cedar-rapids.org

The **Vision** for Cedar Rapids Flood Recovery

Building a Greater Community

Dear Community Members,

We are in the midst of the greatest reinvestment and rebuilding effort in Cedar Rapids' history. As your City Council, we have developed a long term flood recovery plan focused on our City's vision:

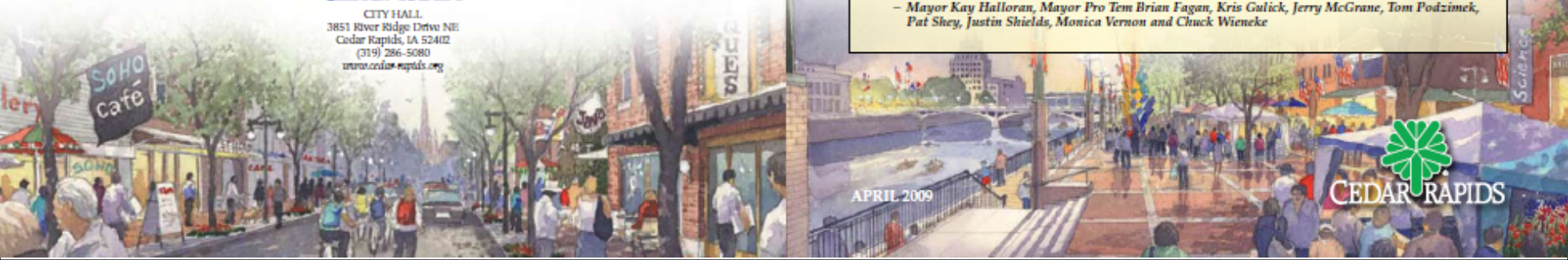
"Cedar Rapids is a vibrant urban hometown – a beacon for people and businesses invested in building a greater community for the next generation."

Throughout the first year of our recovery, we gathered and implemented your feedback to develop a comprehensive three-part plan for building a greater Cedar Rapids:

1. Improve Flood Protection
2. Reinvest in Housing, Businesses & Neighborhoods
3. Rebuild Public Facilities

Your input will continue to be important as this plan evolves over the next fifteen years of our recovery. We are confident in the future of our community, and we thank you for supporting our efforts to create a vibrant urban hometown.

– Mayor Kay Halloran, Mayor Pro Tem Brian Fagan, Kris Gulick, Jerry McGrane, Tom Podzimek, Pat Shey, Justin Shields, Monica Vernon and Chuck Wienke



APRIL 2009



Working Our Plan: Cedar Rapids Flood Recovery & Reinvestment



The Grand Forks flood protection system includes a levee, grassway and permanent and removable floodwalls. This system is similar to Cedar Rapids' plan for a permanent flood management system.



These removable flood wall panels are installed with posts and slots in permanent structures.



Cedar Rapids' interim flood protection system reinforces the City's current levees with water and sand-filled temporary barriers.

1. Improve Flood Protection

We will strengthen the protection of our homes, businesses and public facilities against future flooding. The City's three-part flood management strategy includes:

- Temporary barriers to reinforce current levees
- Construction of a permanent system of floodwalls and levees
- Pursue improved state watershed management policies

PROGRESS:

- 2.66 miles – length of temporary barriers purchased to reinforce current levees
- \$900,000 – cost of temporary barriers
- 24 feet – increased height of current levees with temporary barriers
- 863 – residents provided input on permanent flood management system
- \$1 billion – estimated cost of permanent system of floodwalls and levees
- 120 days – the time it took to create a Flood Management Plan for permanent flood protection. Typically, it takes two years to do this. Thanks to your participation, we did it in 120 days. Now the US Army Corps of Engineers is studying the feasibility of the plan.



These new single-family homes are being built in the Oak Hill Neighborhood.



This is a proposed multi-family development that may be built in the Oak Hill Neighborhood.



This is a sample of one of the 60 Habitat for Humanity homes that will be built in Cedar Rapids over the next three years.

2. Reinvest in Housing, Businesses and Neighborhoods

We are reinvesting in the neighborhoods and business districts along the Cedar River to create vibrant centers for our kids, grandkids and the next generation workforce.

PROGRESS:

- \$26.1 million – Jumpstart funds invested in 1,210 households
- 14 – new houses built to replace the houses lost to floodwaters, so far
- 1,400 – number of residents who participated in the creation of the Neighborhood Reinvestment Area Plan
- 459 – small businesses reopened after the flood, so far
- \$10 million – Jumpstart funds invested in rebuilding 500 businesses
- 120 days – the time it took to create a Neighborhood Reinvestment Area Plan for 10 neighborhoods. Typically, it takes a year to create a plan for one neighborhood. Thanks to residents like you, we created the plan in four months.



Residents help restore a City park damaged in the flood.



After the flood damaged the Waste Water Treatment Plant, City crews pumped the auxiliary sewer system to remove silt in a safe manner.



The first floor of the Public Works building continues to undergo reconstruction and rehabilitation.

3. Rebuild Public Facilities

We will rebuild and repair the flood-damaged City facilities with a focus on customer service needs and sustainable construction standards that will last for decades to come.

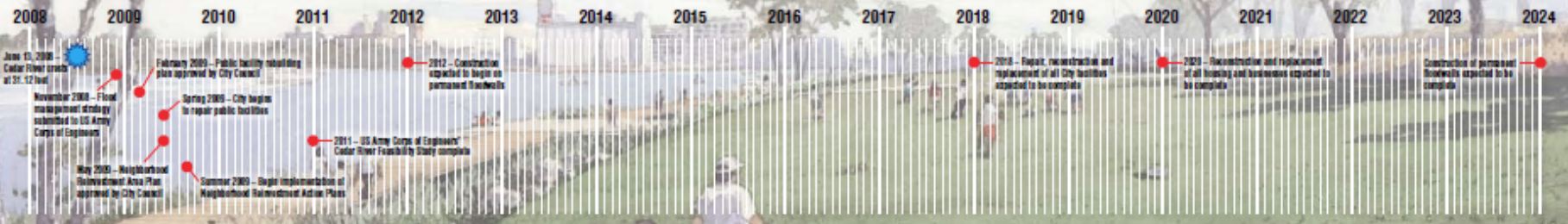
Our commitment to sustainability reflects the need to protect our environment, assure long term economic vitality and control the cost of government.

PROGRESS:

- 310 – number of City facilities damaged by the flood
- 44 – number of public facility rebuilding projects submitted for FEMA funding
- \$500 million – estimated cost of rebuilding and repairing all damaged City facilities
- 11 – number of public facility rebuilding projects expected to begin in 2009
- 3 – number of open houses planned for the summer of 2009 to gather feedback on rebuilding community facilities

Building a greater community for our kids, grandkids and the next generation workforce

FLOOD RECOVERY PLAN TIMELINE



Conclusions

- Communities will gradually spend more time thinking about and planning for recovery before disasters
- Federal incentives may begin to reward this behavior
- States may need to expand their role in supporting recovery planning
 - Potential for using higher-ed and other resources (e.g., Extension)
- Regional planning agencies (COGs, RPAs, etc.) may evolve a larger role in this area as well

Contact Information

James C. Schwab, AICP

Manager, APA [Hazards Planning Research Center](#)

American Planning Association

phone: 312-786-6364

e-mail: jschwab@planning.org

HPRC URL:

<http://www.planning.org/nationalcenters/hazards/>

Next Generation URL:

<http://www.planning.org/research/postdisaster/>

Please wait for the microphone and state your name, affiliation

Q & A

@metroplanners #smartsystems

Metropolitan Planning Council

JOSH ELLIS



Metropolitan**Planning**Council

80 Years of **Reinventing** the Region

Thank you

metroplanning.org/events