

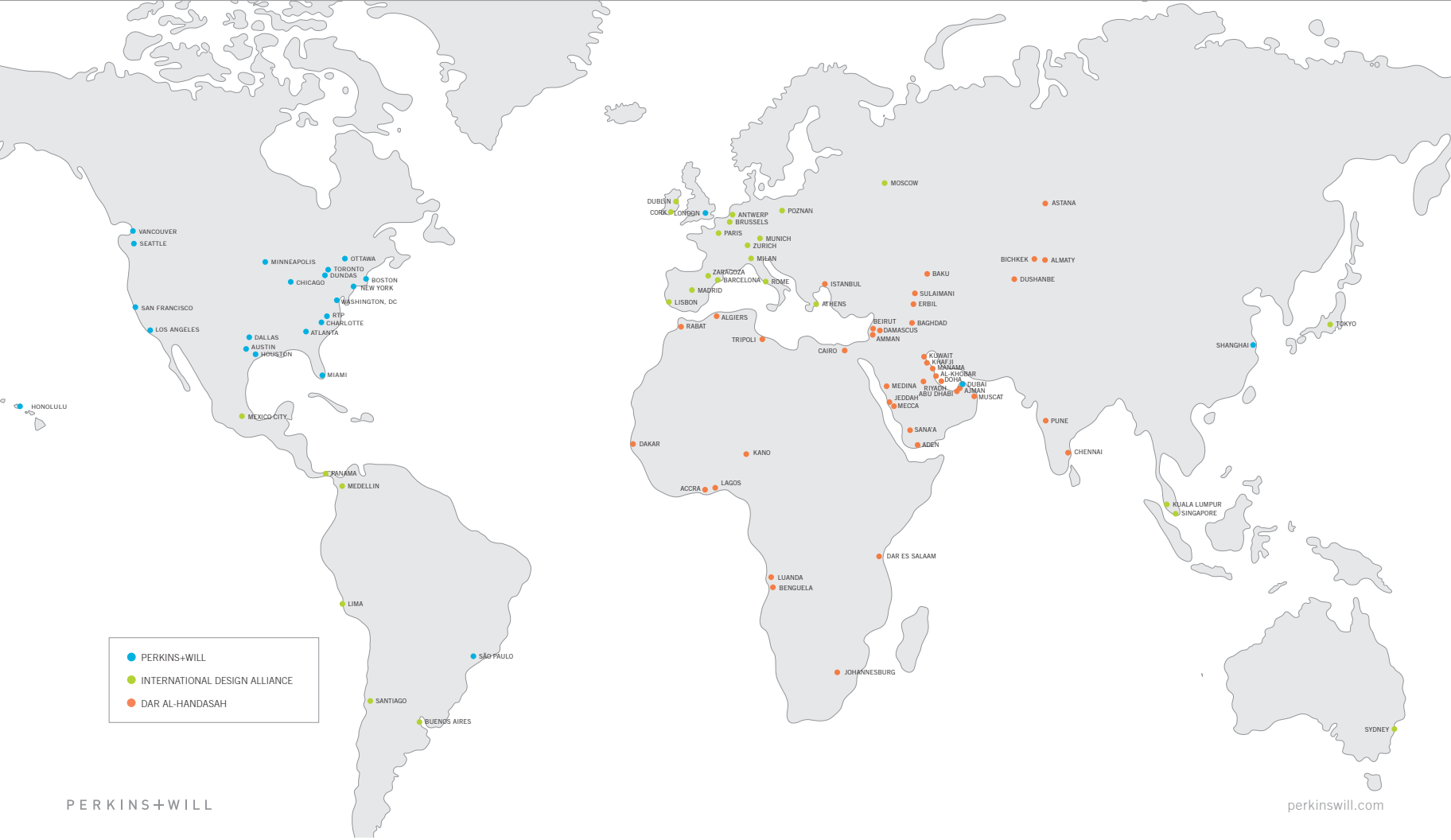
RESILIENCY RESEARCH

ARLEN STAWASZ

HOW PERKINS+WILL IS USING RESEARCH & ARCHITECTURE TO CREATE RESILIENT CITIES

RESEARCH DRIVEN / VISUALIZATION LABS





WHAT IS...

RESILIENT DESIGN /

pursues Building + Communities that can survive, recover, grow and thrive when facing acute shock events or long-term stressors, through a combination of diversity, foresight and the capacity for self-organized and learning.

A RESILIENT SOCIETY /

can withstand shocks and rebuild itself when necessary. It requires people to embrace their capacity to anticipate, plan and adapt for the future.



WHY RESILIENT DESIGN?

▲ INCREASED OCCURRENCE /

of extreme natural events, acute events and on-going chronic issues.

▲ INCREASED AWARENESS OF AND DEMAND /

for resilient solutions by residents, business owners, and leaders at all levels in areas recently affected by acute events and those most likely to be affected in the future.



▲ **INCREASED PRESSURE ON CITIES AND BUSINESSES /**

to protect populations and investments.

▲ **INCREASED AWARENESS /**

of the link between climate change and population health.

▲ **INCREASED KNOWLEDGE /**

of risks to vulnerable populations.





UNDERSTANDING CHALLENGES:

ACUTE SHOCKS /

Quick impacts from extreme social, environmental, and economic events

SOCIAL /

- Bias crime
- Civil unrest
- Terrorism
- Infrastructure failure
- Disease outbreak
- Fuel supply disruption
- Blackout

ECONOMIC /

- Stock market crash
- War
- Cyber attack
- Business closure

ENVIRONMENTAL /

- Extreme rainfall
- Severe storm
- Fire
- Snow/blizzard
- Severe ice storm
- Freezing
- Mudslide or landslide
- Flood
- Extreme heat or cold
- Volcanic eruption
- Hurricane or tsunami
- Earthquake



UNDERSTANDING CHALLENGES:

CHRONIC STRESSORS /

Lingering impacts from repeated exposure to social, environmental, and economic problems

SOCIAL /

- Aging
- Disability
- Disease
- Homelessness
- Low education
- Language barrier

ECONOMIC /

- Debt
- Poverty
- Recession
- Unemployment

ENVIRONMENTAL /

- Air pollution
- Coastal erosion
- Deforestation
- Drought
- Species engagement
- Water scarcity



\$55T / \$43B

necessary investment / available

\$35 TRILLION / 2070

infrastructure improvements needed to adapt port cities

\$1 / \$100 / 300

invested in establishing credit worthy-ness / return on investment / priority cities

PEOPLE ARE TALKING

2015 /

[Obama Administration](#) issues **federal mandate to integrate resiliency strategies** into all capital projects.

[Pope Francis](#) issues his encyclical **linking social justice and climate change**.

[The Lancet](#) issues comprehensive reporting **linking population health and climate change**.

2016 /

[COP21](#) Paris Climate Conference sets out global action plan that is the the **first-ever universal, legally binding global climate deal** adopted by 195 countries.

[HUD](#): The National Disaster Resilience Competition (NDRC) will make nearly \$1 billion available to communities that have been impacted by natural disasters.

[The World Economic Forum](#) named **failure of climate change mitigation and adaptation** as the risk with the greatest impact.

MAJOR ORGANIZATIONS HAVE MOBILIZED

GROSVENOR /

Resilient Cities Research Report – Quantifying the resilience of 50 of the world's most important cities.

OCHA/

Office for the Coordination of Humanitarian Affairs at the United Nations. Working globally to create networks of organizations to help respond to climate crises and resulting humanitarian issues. The Disaster Resource Partnership is a construction network led by Hindustan Construction.

WORLD BANK /

Urban Risk Assessment – Bringing a common approach to identifying people and infrastructure that are most vulnerable to natural hazards.

ROCKEFELLER FOUNDATION /

100 Resilient Cities Project. \$164 million to fund Chief Resilience Officers in 100 cities

RESILIENCY AND SUSTAINABILITY

While there are significant areas of overlap between resilience and sustainability, one does not replace the other.

They are **two complementary areas of focus in the continuum** of green and restorative design practices.



RESILIENCY PRINCIPLES

DIVERSITY /

ADAPTIVE CAPACITY /

NESTED SCALES /

REDUNDANCY /

FORESIGHT /

SELF ORGANIZATION /



A Whole System Must
Include All Principles





3 CORE QUESTIONS



01 / What are the climate projections in your project location?



02 / What are its vulnerabilities as a result of those projections?



03 / How does your design solution address those vulnerabilities?



A blue-tinted photograph of a coastal highway. In the foreground, a section of the road has collapsed, with debris visible. In the background, a bridge spans a body of water, and a hillside is visible. Several vehicles are stopped on the road further back.

RELI THE RESILIENCY ACTION LIST



RESILIENCY ACTION LIST (RELi)

DESIGNED FOR RAPID UPTAKE /

Compatible with both New Construction and Existing Buildings

UNIQUE AREAS /

- Hazards, extreme events, adaptation
- Strong ties to financing, regional economics
- Expanded social cohesion
- Expanded community + local self-reliance

COMPREHENSIVE /

- Designed for scale-jumping
- City + Region → Campus + Site → Organization + Building
- Facilitates Correlated Risk + Co-benefits



RESILIENCY ACTION LIST (RELi) REFERENCED ACTIONS

Unique RELi Credits: Hazard Preparedness, Social Cohesion, Regional Economics

ANSI Integrative Process: Standard (MTS Developed)

Integrative Living Design Planning Process: University of Minnesota

Red Cross: Ready Rating Program for disaster preparedness

FEMA 141 Guide: Emergency Management Guide for Business + Industry

U.S. Small Business Administration + Prepare My Business.Org

Fortified for Safer Business Standard V1.0

Urban Green Building Resiliency Task Force, June 2013 Proposals (NYC)

EPA Vulnerable Zone Indicator System + EnviroFacts

Nuclear Regulatory Commission: Academy Of Sciences

Envision Sustainable Infrastructure Rating System V2.0

Center for Active Design

Sustainable Sites Rating System V2

LEED V4 and V2009 / NC, ND + Schools



RESILIENCY ACTION LIST (RELi) FINANCE STANDARD

THE GREEN BOND MARKET /

2013 \$11 Billion

2014 \$36 Billion

2015 \$42 Billion



2016 Projected \$50 Billion

**CAPITAL MARKETS
PARTNERSHIP**

Hon. Gavin Newsom
California Lieutenant Governor,
Chairman

Vickie Tillman, Former S&P
Global Ratings Head, Vice Chair

ACEE
Appraisal Institute
Australia
Bank of America Securities
Baltimore Green Building Council
BOMA Foundation
BOMA International
Canada Green Building Council
CBI
Citi
Citi Property Investors
City of Chicago
City of Dallas
City of Denver
City of New York
City of Oakland
City of Santa Monica
City of San Francisco
City of Seattle
Citizens Bank of Canada
Crescent Global
Delaware Valley Green Bldg. Council
Dewey & LeBoeuf
Durst Development
EPA ENERGY STAR
Environmental Bankers Association
Evolution Partners
Fannie Mae
Fireman's Fund Allianz
First Affirmative Financial
Forbo Flooring
Forest Stewardship Council
Gordian Edin Development
Goldman Sachs
Green Building Alliance
Global Green
Investor's Circle
JP Morgan Chase
Lafarge
Matchell, LLC
Milliken
Morgan Stanley Smith Barney
National Association of Realtors
New Jersey Green Building Council
New York Green Building Council
NYSEERDA
Philip
Prohoff & Associates
Sempra Energy
Social Investment Forum
State of California
State of New Jersey
Swinerton Builders
Turner Construction
US Securities
United Kingdom
US Green Building Council
US Treasury Department
Venetia Bank
Vinson & Elkins
Wells Fargo
Wendel Rosen Black & Dean
West Coast Green
World Green Building Council

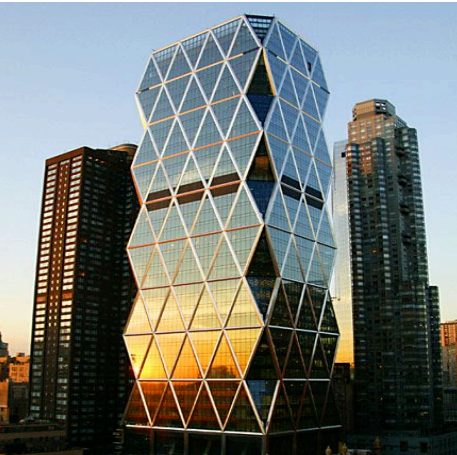


**National Consensus
Green Building
Investment Underwriting
Standards**

Commercial Buildings

UNANIMOUSLY APPROVED
September 2, 2008

Version 2.2 – July 2012

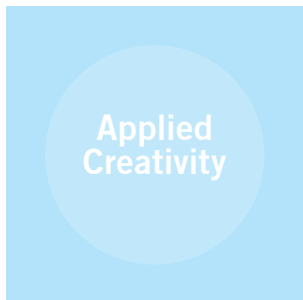




RESILIENCY ACTION LIST (RELi)

8 CATEGORIES

INNOVATION



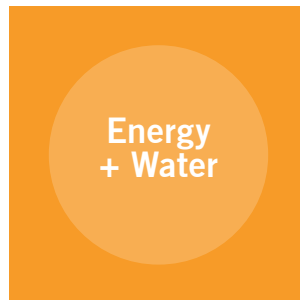
PLANNING + OPS



ADAPTATION + MITIGATION: ACUTE EVENTS



COMPREHENSIVE ADAPTION + MITIGATION





ACTION LIST /

Summary / 60+ Actions

[illegible]

PROJECT TALLY /

Tracking / Excel Spreadsheet

RED PROJECT TASK
MAY 2015

May 1st (Friday) - May 31st (Friday)

Project Details:

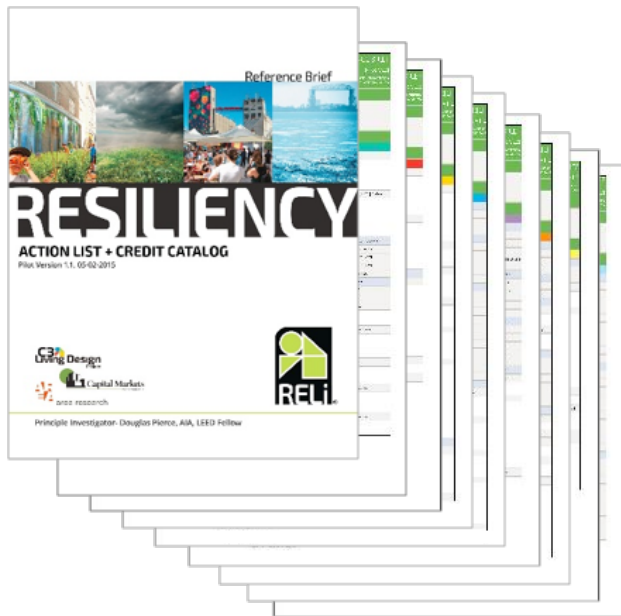
- Project Name: [Redacted]
- Project Manager: [Redacted]
- Project Start Date: [Redacted]
- Project End Date: [Redacted]
- Project Budget: [Redacted]
- Project Status: [Redacted]

Task List:

- Task 1: [Redacted]
- Task 2: [Redacted]
- Task 3: [Redacted]
- Task 4: [Redacted]
- Task 5: [Redacted]
- Task 6: [Redacted]
- Task 7: [Redacted]
- Task 8: [Redacted]
- Task 9: [Redacted]
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- Task 12: [Redacted]
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- Task 29: [Redacted]
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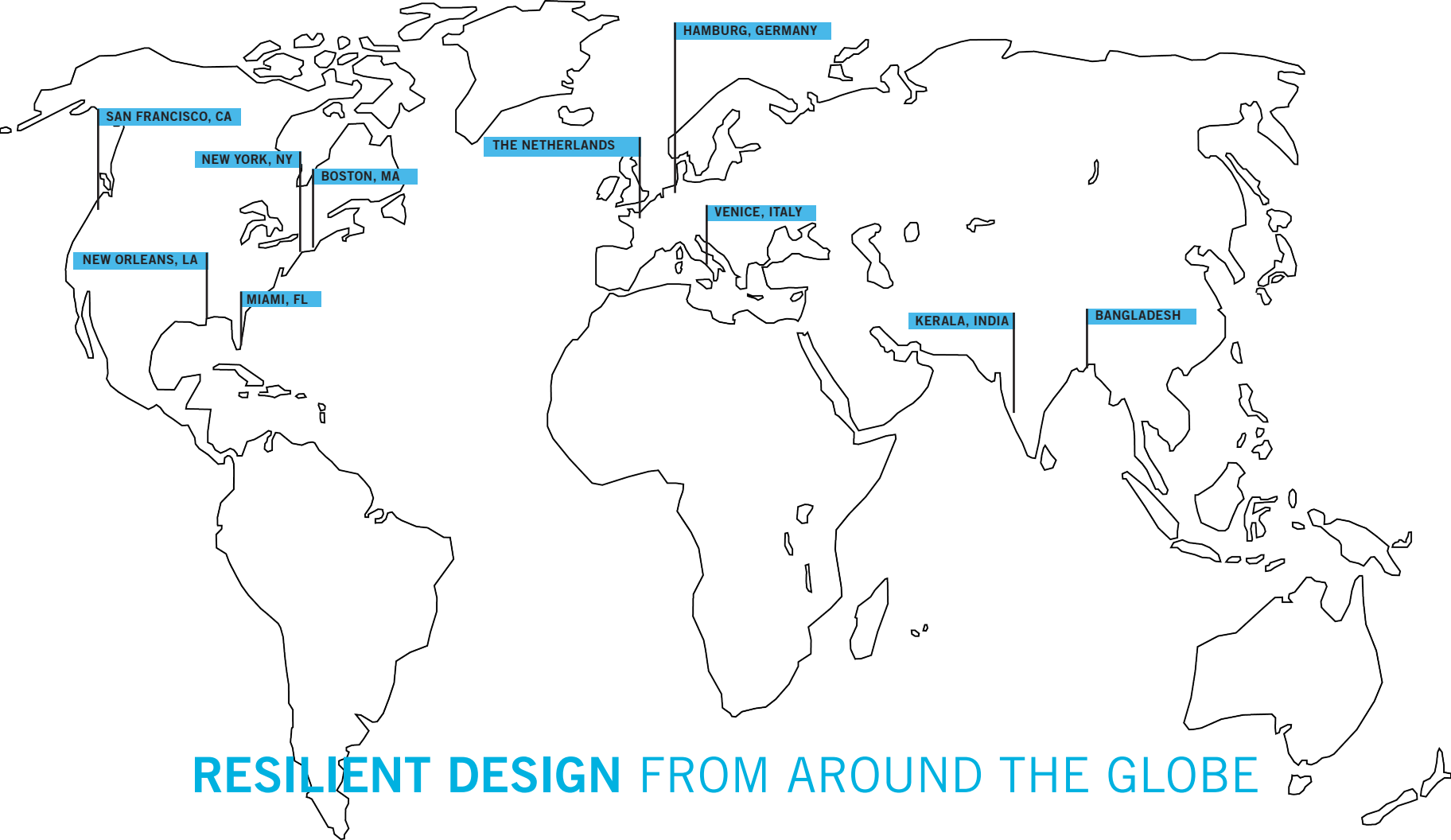
CREDIT CATALOG /

Comprehensive / 200+ Actions and How-to-Use



CANALS IN OUR CITIES

A GLOBAL PERSPECTIVE



SAN FRANCISCO, CA

NEW YORK, NY

BOSTON, MA

NEW ORLEANS, LA

MIAMI, FL

THE NETHERLANDS

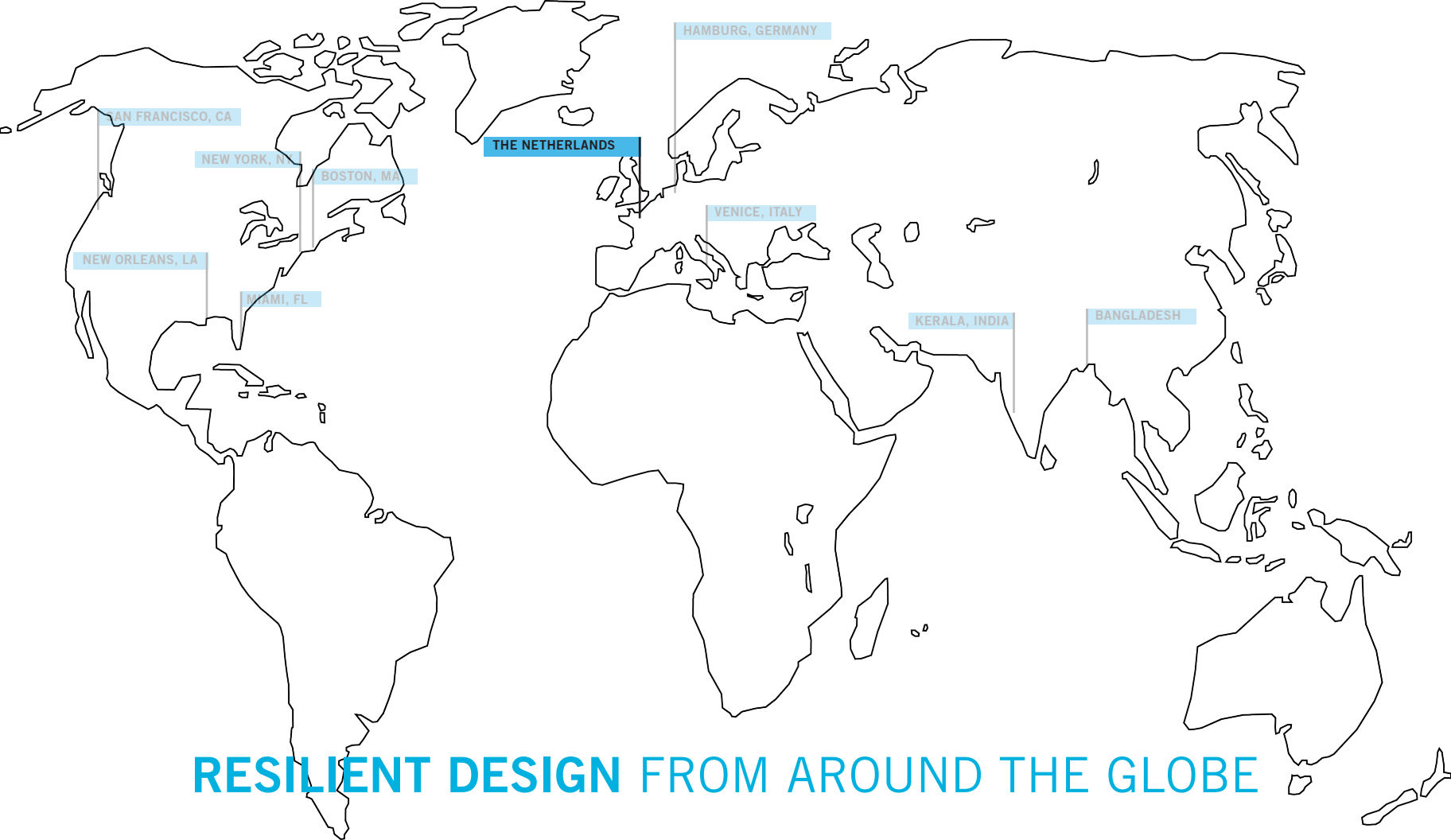
HAMBURG, GERMANY

VENICE, ITALY

KERALA, INDIA

BANGLADESH

RESILIENT DESIGN FROM AROUND THE GLOBE



SAN FRANCISCO, CA

NEW YORK, NY

BOSTON, MA

NEW ORLEANS, LA

MIAMI, FL

THE NETHERLANDS

HAMBURG, GERMANY

VENICE, ITALY

KERALA, INDIA

BANGLADESH

RESILIENT DESIGN FROM AROUND THE GLOBE

LESSONS LEARNED FROM THE NETHERLANDS



The Netherlands is slightly less than twice the size of New Jersey



New Jersey



Netherlands



The Netherlands is one of the most densely populated nations in Europe



**But there are actually more
bicycles than people!**



The Netherlands is considered third happiest nation in the world

1. Denmark
2. Norway
- 3. Netherlands**
4. Switzerland
5. Sweden
6. Canada
7. Finland
8. Austria
9. Iceland
10. Australia



Netherlands

FUN FACTS

67% of the Netherlands requires protection of dykes + dams

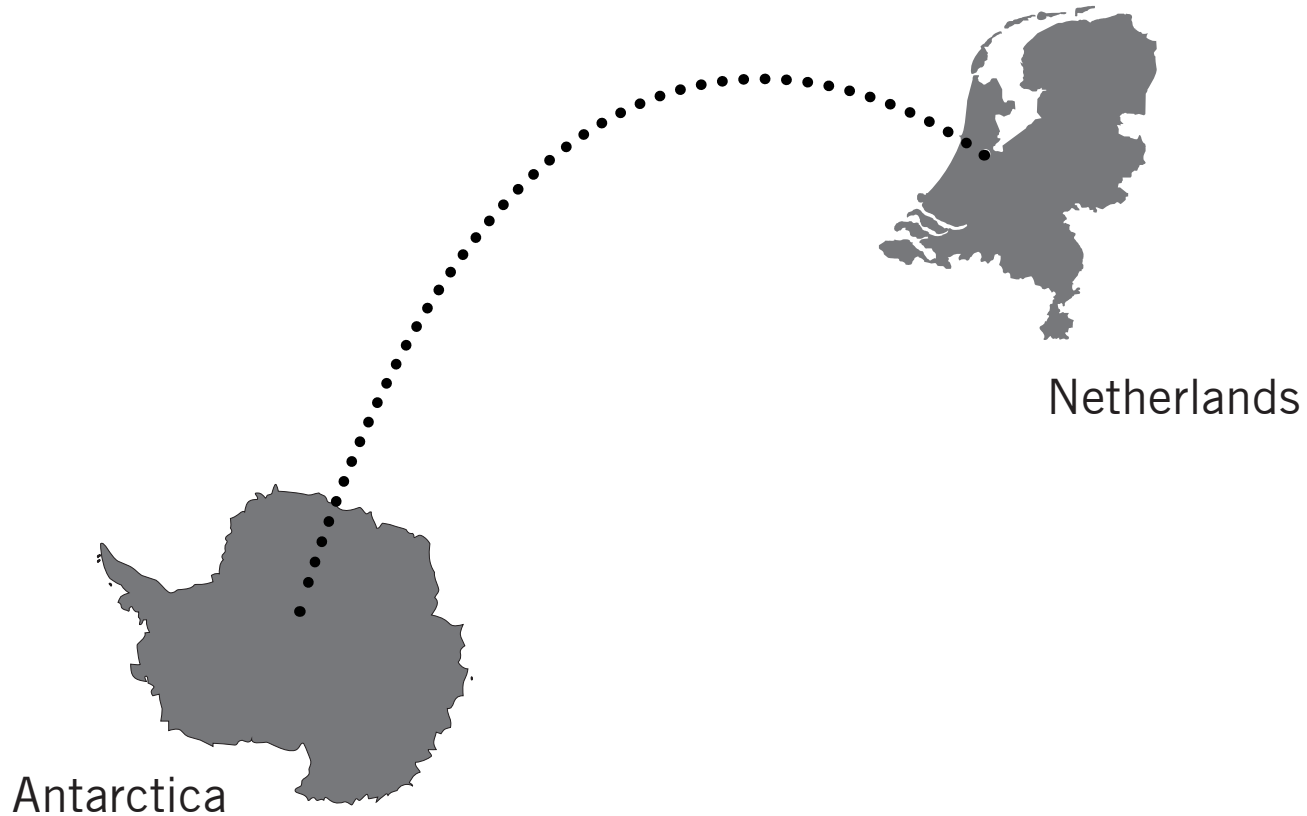
26% of the land is below sea level



There are over 14,000km of dykes in Holland



That's equal to the distance between NL + South Pole



NORTH SEA FLOOD FEBRUARY 1953

South-west part of Holland and killed 1,836 people



THE DELTA WORKS, 1958

“Living with Water / We are here to stay”



There is a network of (13) dams, I visited (6) of them

1960's awareness the environment

Major Ecological Concerns

- environmental protests
- ecological life decline
- scientific + fisherman protests

Economical + Recreational Opportunity



Maaslanterkering - Storm Surge Barrier, 1997



Oosterscheldekering - Storm Surge Barrier, 1986



There are over 100km of canals in Amsterdam



OVER 1500 BRIDGES



CANALS OF AMSTERDAM



RECREATIONAL OPPORTUNITIES



RECREATIONAL OPPORTUNITIES



CANAL MAINTENANCE



CANAL MAINTENANCE



THE WATER KING + THE WATER COUNTRY



William Alexander - King of the Netherlands

Expert in Water Management

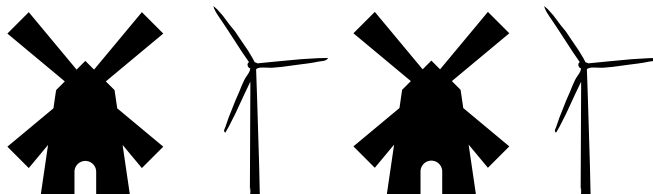
Over 7 Billion Euros to keep the water out!



Over 20,000 jobs provided!



Over 4,000 working pump stations!



URBAN LAND INSTITUTE

LIVING WITH WATER

An aerial photograph of a city skyline, likely New York City, featuring numerous skyscrapers and a body of water in the foreground. The image is overlaid with a semi-transparent blue filter. The text is positioned on the right side of the image.

THE URBAN IMPLICATIONS OF

LIVING WITH WATER

BACK BAY TODAY



BACK BAY + 6FT SLR



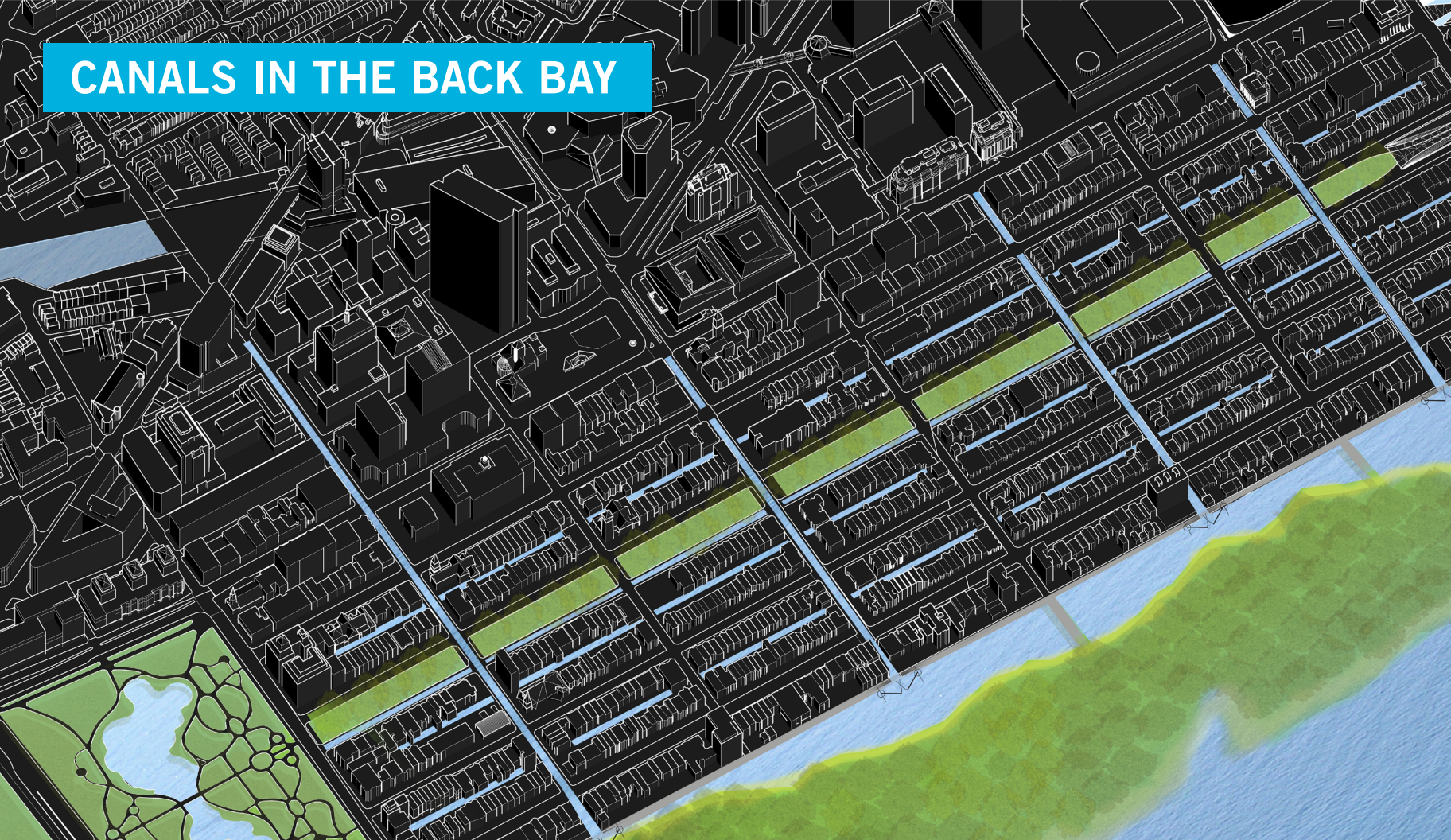
CANALS IN OUR CITIES



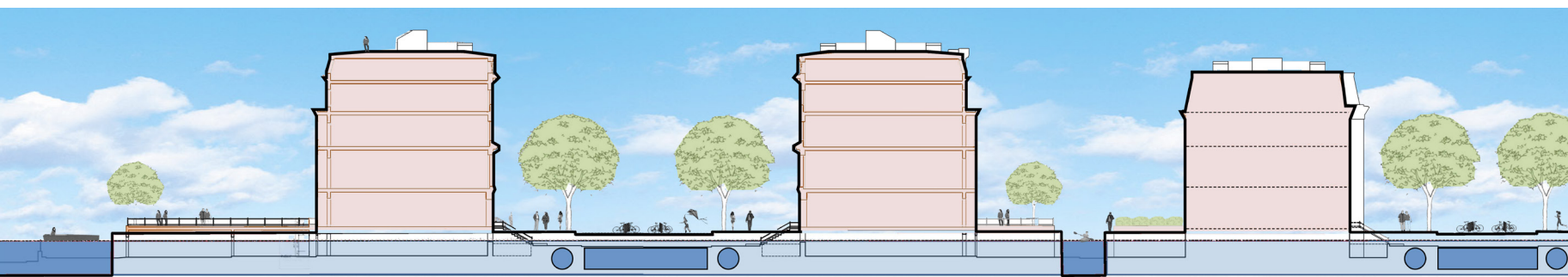
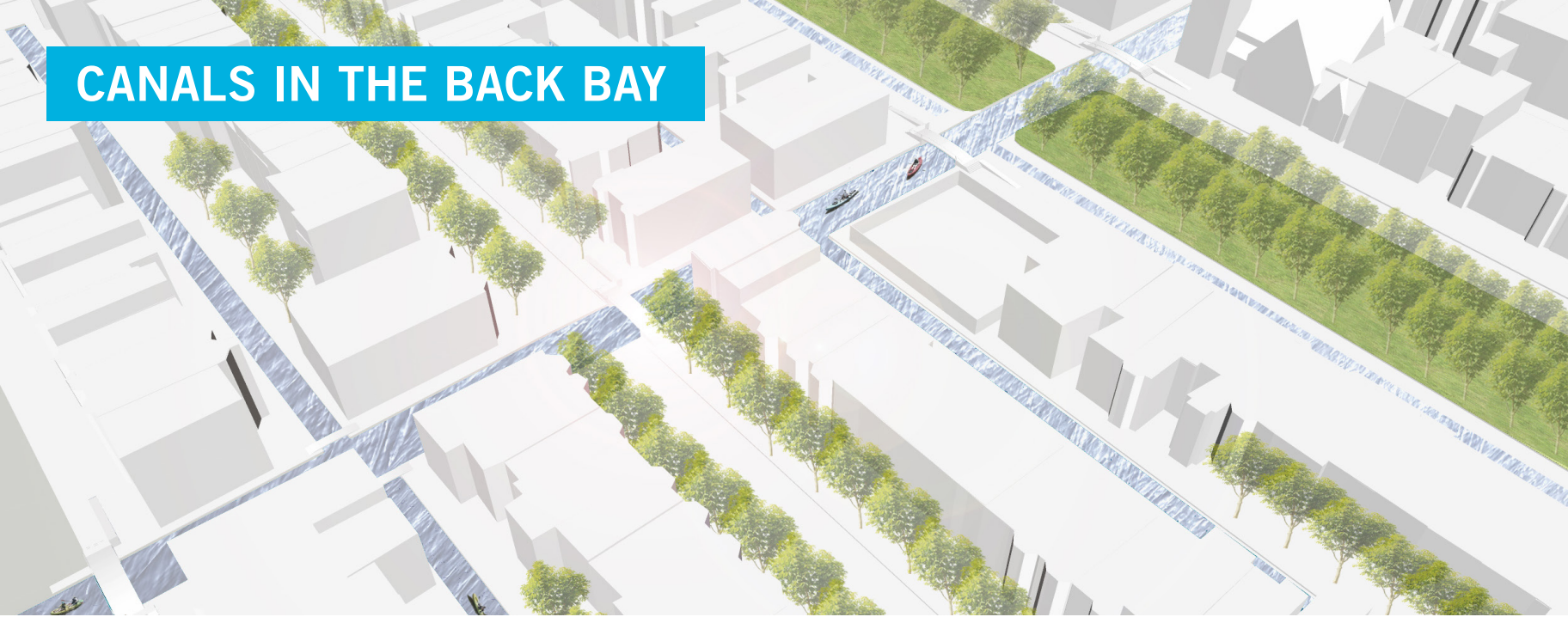
A COLLABORATIVE PROCESS



CANALS IN THE BACK BAY



CANALS IN THE BACK BAY



CLARENDON STREET CANAL



PEOPLE ARE ALWAYS DRAWN TO NEW CONCEPTS OF LIVING

45 PUBLIC MEDIA SOURCES

OVER 350 MILLION VIEWS

TRANSLATED INTO 10
DIFFERENT LANGUAGES

HUB FACING ROUTE CANAL?

Community. Boston should transform the streets of Back Bay into a system of canals to alleviate damage from rising water levels, suggests a report issued Tuesday by a group of experts.

Clarendon Street, seen in this artist's rendering, is among the thoroughfares that the Urban Land Institute suggests should become a canal.

Open 'till
Midnight thru
Halloween!

200 Broadway
617.876.5230 bost

First
Ebola
confu

PAGE 05

Image
knows
credit

PAGE 08

Design
for you
apartm

PAGE 10

THANK YOU